

Our Air-Age World

A TEXTBOOK IN GLOBAL GEOGRAPHY

LEONARD O. PACKARD

HEAD OF THE DEPARTMENT OF GEOGRAPHY
TEACHERS COLLEGE OF THE CITY OF BOSTON

BRUCE OVERTON

FORMERLY OF THE MALE HIGH SCHOOL
LOUISVILLE, KENTUCKY

BEN D. WOOD

COLUMBIA COLLEGE, COLUMBIA UNIVERSITY



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FOREWORD

Today we think in global terms. We are engaged in a global war. The airplane is daily making our globe smaller and smaller. The airport is emerging as a new type of commercial center which is already competing with the seaport and the railroad center. Time and space are constantly being reduced. We are rubbing elbows with people who formerly seemed far away. We must become acquainted with lands and peoples which have seemed far removed from our lives and interests. We must become better acquainted with foreign lands not so far away. Surely this is the time to gain a knowledge of global geography.

The world of today presents to the student of geography a difficult problem. In all continents, including our own, conditions—agricultural, industrial, commercial, political, and social—are most unsettled and are subject to abrupt changes. For these reasons it is a great temptation to the teacher of geography to wait until the war is over—until new boundaries are drawn and perplexing problems have been settled. There is the feeling that it is easier and much safer to teach the world of yesterday which no longer exists and which can never be restored. But the questions must be faced as to when conditions will become stable and what is to be gained by waiting. If we wait a year, or two years, or until the close of the war, the sources of information will be practically as limited as now. New boundaries alone add little or nothing to the knowledge of the areas enclosed. Furthermore, the pupils of today are as fully entitled to an interpretation of their world as those who preceded them or those who are to follow them. Is it not they who must play the largest part in solving the many post-war problems? What those problems will be are fairly well known today.

Our own country more than any other is exerting a tremendous influence in world affairs. Our armed forces are to be found in all continents, and many of them are likely to remain in areas of unrest for several years at least. World problems arising after the war will in large measure be our problems. Our interest in all parts of the world will be greatly increased because there will come back to practically every home in the country men and women who have

served in Europe, Asia, Africa, and South America—in the islands of the Atlantic, the Pacific, and the South Seas—and in the “land down under,” Australia.

After the war there will be an intensified interest in our industrial and commercial relations with other lands. The producing power of our country as a result of war activities has been increased many fold. New markets must be found to keep our great plants and the multitude of our skilled workers employed. There will arise keen competition with former great industrial countries. Other countries will also arise as industrial competitors. Among these we may well expect to find Russia and, before long, China. Many nonindustrial parts of the world will have been awakened by their new contacts with industrial peoples. In such countries we may expect to see higher standards of living attained—brought about in part at least by the efforts of the Great Powers. As such changes take place, there will be greater exchanges of goods between those young industrial regions and all other parts of the world. These are some of the changes we may expect to see in the world that is to be.

It is for active participation in this new world that the youth of the country must be prepared. They must understand the changes which take place and understand them as they are taking place. To know the world of the past is necessary, but it is not enough. Our citizens of tomorrow must understand as fully as possible the forces now striving in the world—the one to enslave mankind, the other to make it free.

It is with these thoughts in mind that this text has been written. The authors have tried to show what forces are now operating to bring about a new world in which America must play its part. Whether we wish it or not, our country is and of necessity will be involved in all world movements. It simply cannot be isolated from other nations. No greater duty confronts the schools of this country than to train our youth to see our country's responsibilities as a world power and at the same time to train them to help their country meet those responsibilities.

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Photo from Keystone View Co.

The two clippers. The old sailing clipper in the shadow, and the modern four-motored China clipper in the foreground. Each in its day was considered the last word in transportation. The luxury ocean liner eventually succeeded the sailing clipper, and after the war we may expect to see the China clipper surpassed by the airplane of the future.

PART ONE. GLOBAL GEOGRAPHY

UNIT I. A NEW POINT OF VIEW

I. MAN'S WIDENED HORIZON

Man's horizon. The horizon is the line where, to the observer, the earth and sky seem to meet. Every observer is at the center of his horizon. As he moves his horizon moves with him. In common with man, every living creature from the lowly earthworm to the lofty eagle is ringed in by a horizon. But what a span between the worm's-eye view and that of the eagle's!

Man masters his environment. Physically, man is closely related to all the lower forms of life. Like them he is born. Like them he must die. Like them he is subject to heat and to cold. Like them he may be overcome by flood, drouth, or any of the other overwhelming forces of Nature. But unlike the lower animals, man has two other horizons: one intellectual, the other spiritual. It is the use of what lies within the range of these two horizons: his intellect, his innate curiosity, his lively imagination, his great desire to know, to do, and to master, plus his faith in himself and in his God that have led him literally to move mountains, dam streams, cross the oceans, and conquer the air. It is given to man alone to choose whether he will master or be mastered, whether he will grovel like the worm or soar like the eagle.

Man flies. Thousands of years ago the psalmist said, "Oh that I had wings like a dove!" Before that could be accomplished, however, man for many untold years had to wrestle with the land, contend with the sea, and, like the reed, bend humbly to the forces of the air before he could lift his feet from the ground. Once that was done, he soon matched not only the flight of the dove but out-distanced the lordly eagle.

As early as the year 1782 experimenters were working with balloons and making sensational ascensions. While balloons floated and soared, since they lacked wings, their performances did not take on the characteristics of the flight instinctive to birds and now acquired by man. The unrelenting research made by scientists during the nineteenth century made that feat possible.

Sixty hours from anywhere. It was at Kill Devil Hill near Kitty

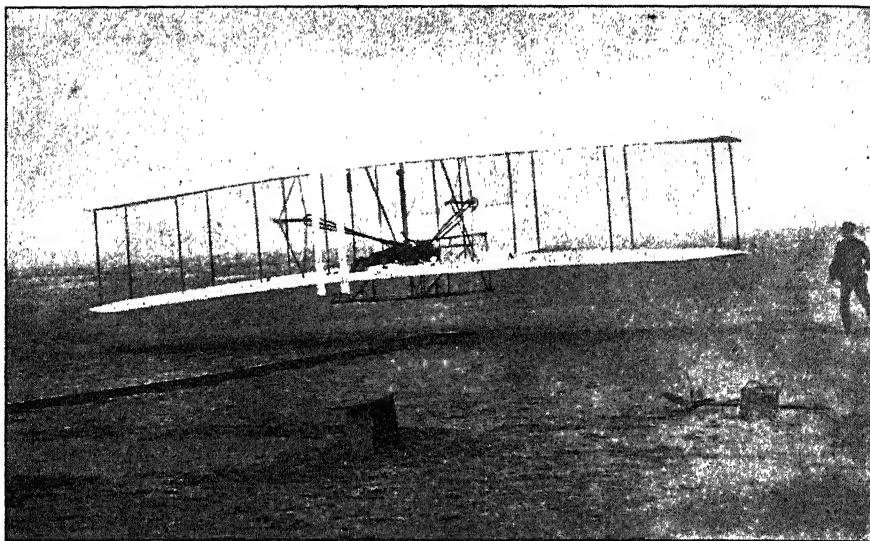


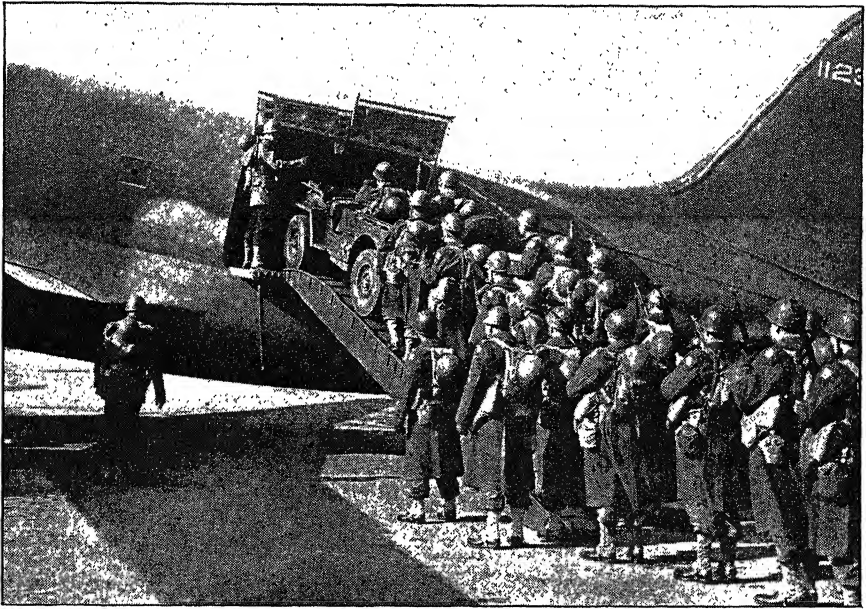
Photo from Brown Brothers

This is the Wright brothers' plane at Kitty Hawk. Orville Wright is lying prone in the plane and Wilbur is running alongside.

Hawk, North Carolina, in the year 1903, that the Wright brothers lifted their cumbrous plane from the ground. Although the duration of that first flight was measured in seconds and the distance in feet, the effect was illimitable. From that moment mankind the world over began to grow air-conscious, then air-minded, and has now become air-adapted. Today it is claimed that no place on the surface of the earth is more than sixty flying hours from one's nearest airport!

Global geography. The results of the conquest of the air are so manifold that one can scarcely compute their far-reaching effects. One of the most startling changes to come in our day is the change in our viewpoint concerning the earth on which we live. Whereas in former times, although we acknowledged the earth to be a sphere, we really thought in terms of a flat surface, we now, with our bird's-eye view, accept the earth for what it is, a globe, and henceforward shall base our geography on that—global geography.

It took a global war to focus our attention upon the necessity for global geography. In no other war has the air arm of fighting forces been so important in war strategy. Giant bombing planes, carrying tons of demolition and incendiary bombs, can fly by night or by day and rain destruction on munition plants, military installations, railroads, bridges, troop concentrations, and harbors. More important still is their use as an umbrella over advancing tank forces and infantry as a protection and to soften up the enemy. The lack of an



Courtesy Curtiss-Wright Corporation

American troops going aboard a transport plane

airplane escort for convoys or battleships may result in great losses at sea, as was the case in the sinking of the *Repulse* and the *Prince of Wales* by the Japanese on December 10, 1941, while attempting to give support to the Imperial land forces fighting in Malaya. Huge transport planes can carry parachutists or bodies of troops and even large tanks with ammunition for their cannon and other weapons, and set them down behind the lines of the opposing forces.

Important as aviation is in war, its future in peacetimes can only be imagined. Tennyson's vision of it as proclaimed in his "Locksley Hall" was indeed prophetic. Yet in this field no limit should be put on man's ingenuity and daring.

GUIDES TO STUDY

1. How would the horizon of a person at sea differ from that of a person in a valley in a mountainous region?
2. How does the extent of the horizon of a pilot in flight differ from that of a member of the ground crew?
3. What do we mean when we say that the radio and the airplane have widened our horizons?
4. Ships on long voyages must in general sail east and west. Why? In what directions may airplanes fly on long flights? Why? How do airplane routes differ from those of trains and ships? Why? Airplane routes show that we recognize the earth as having what form?

5. Our soldiers are stationed in 51 different parts of the earth. In what directions do planes fly to carry men and supplies to these stations? What illustrations can you give to show that the people of our country are interested in all parts of the world? In what places shall we be interested after the war? Why? Why then do we study global geography?

6. In what sense are we now living in a new world?

TOPICS FOR CLASS DISCUSSION

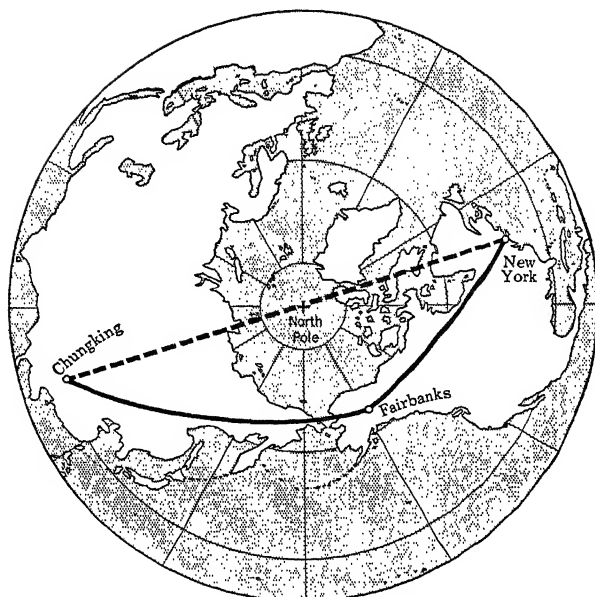
1. Our horizon moves as we move.
2. The present interest in global geography. Why?
3. The extent to which man can control his environment.

WORK TO BE DONE

1. Study and report on man's early attempts to fly.
2. The circumference of the earth is about 25,000 miles. Try to show that a plane moving at the rate of 250 miles per hour could reach any place in the world from your home in less than sixty hours of flying time?
3. Give illustrations to show that man has mastered his environment. For example: How has he prevented floods? How has he made use of deserts? How has he made use of power from coal, oil, and water? How has he mastered space and time? Make a list of other ways in which man has made use of natural resources and thus has become master of his environment.
4. Bring in articles from newspapers and magazines which show how and why we are interested in all parts of the world. What do these articles tell us of global geography and global thinking?
5. Paste in your notebook the best newspaper maps you can find. Select particularly those places in which our forces are stationed. These maps will give much more detail than the maps in your text or those on the wall. Find the places as best you can on the map in your text, on the wall map, and in an Atlas or on the globe.

2. A NEW MEDITERRANEAN

A world Mediterranean Sea. The global concept of geography is already working a profound change in our whole geographical outlook. Instead of our thinking "East is East and West is West and never the twain shall meet" and, figuratively if not literally, accepting the north polar regions as faraway Santa Claus land, we have at last awakened to the fact that the East is on our front doorstep and the north pole in our backyard. If one needs proof, let him consult a polar projection map. There he will find North America, Europe, and Asia ringed in an almost unbroken circle about the polar sea. To be sure, the sea is an icy, frozen waste, but there are no mountains or other barriers between us and the backyards of our neighboring continents—in other words the bars are all down. That



Courtesy Consolidated Vultee and Richard Edes Harrison

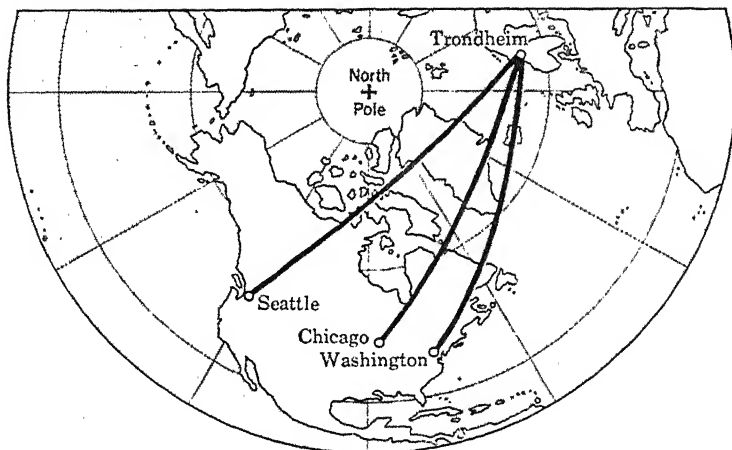
The most direct route from New York to Chungking leads directly over the north pole. The usual route followed by airplanes is via Fairbanks.

this fact is beginning to be recognized is already evident by the sober discussion one hears on every hand as to *who is to be allowed to fly where* when the war is over.

Crossing the Arctic. A polar map has no significance for travel by land or sea. There are no means of land transportation that could adequately overcome the barriers of ice and snow of polar regions. Even when partly open the polar seas offer many insurmountable obstacles to water transportation. If all other difficulties could be resolved, the time element alone would rule out both land and sea travel over the frozen wastes of this region.

Over the pole. However, when we have the airplane capable of traveling hundreds of miles an hour and an uninterrupted ocean of air enveloping the earth above, the significance of the map becomes quite clear. We are confronted with a new geographic condition. What was once far away in time and distance because of modes of travel and customary routes has become just over the hill to an airplane flying a great circle route.

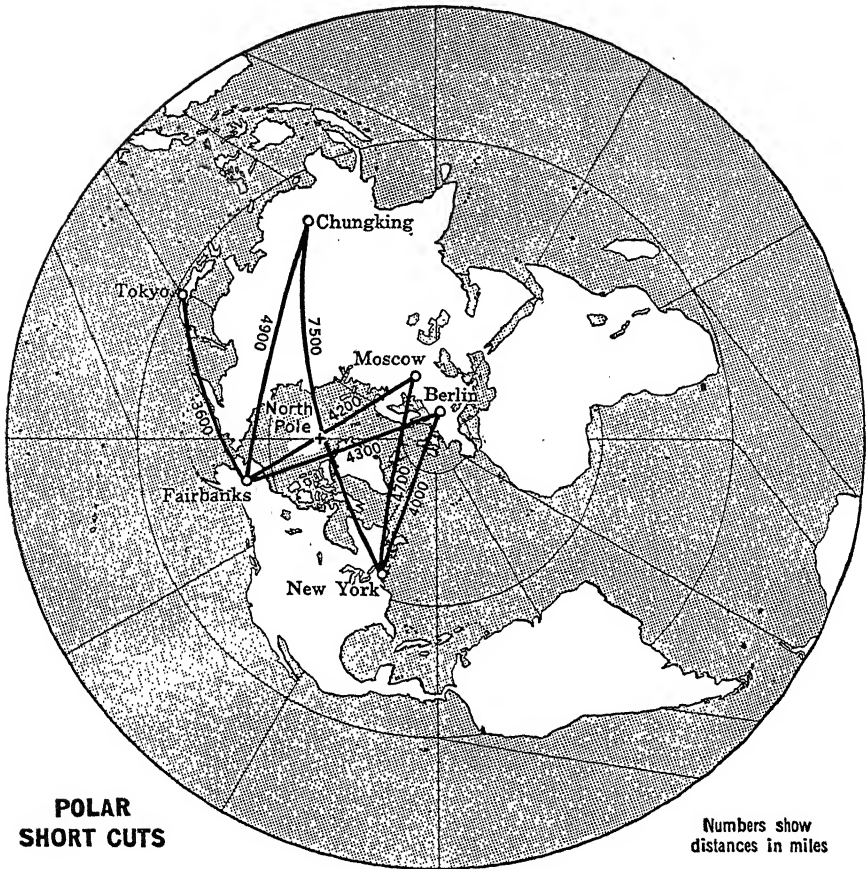
A new geography and a new world. A transport plane carrying a sufficient supply of gasoline for a non-stop flight could fly from La Guardia Airport, New York, directly north over the north pole and land at Chungking, China, in about 23 hours if it could maintain



Courtesy Consolidated Vultee

a speed of 300 miles an hour. When we consider how rapidly the airplane industry is turning out larger and faster planes such a flight by single stratoplanes or flocks of them is highly probable. Necessary supplies thus could reach our harassed allies, the Chinese, in less than 24 hours which now take weeks to reach them by the Atlantic, Cape of Good Hope, and long overland route into the heart of China. Even today by swift long-range fliers—via Fairbanks, Alaska—Chungking lies only 7500 miles, or 38 hours, from New York. From New York to Chungking by train and ship is about 11,300 miles; across the continent to San Francisco, then by ship to Honolulu in Hawaii, on to Manila in the Philippines (before the Japanese moved in), to a Chinese port, and then overland to the capital Chungking. An uninterrupted journey would require more than a month. Should Japan win this war, it would be entirely possible for that country to dictate peace from Washington, and Japanese ambassadors would not be obliged to use subterfuge to gain time, for they would not be obliged to go the long way round to reach Washington, either. They could fly directly across the Bering Sea.

Time, a fourth dimension. The North Atlantic, which it once took swift ocean liners four days to cross, can now be spanned by air liners in 400 minutes. In an airplane a traveler can go from New York to Moscow in less time than he can go by fast train from New York to Miami, Florida. The route from New York to Bombay, India, is not a three-week voyage via the Strait of Gibraltar and the Suez Canal but a 40-hour flight where the way stations are Iceland, Oslo, and Moscow. A Liberator flew from Australia "way down under" to the United States in less than 36 hours of actual



flying time. No far-off spot on the earth is more than 60 air hours from any airport.

Air hours. By means of the airplane man has created an entirely new geography. No longer should distances be thought of in statute or nautical miles of travel, by land or sea, for a new dimension has been brought into man's geographic thinking. It is time—air hours. In the proportion that travel time by airplane has been reduced, continental stretches have been compressed, ocean expanses have shrunk to the dimensions of straits, and islands dotting the ocean have become stepping stones. The peoples of the earth have become a global community for good or ill. They must either become friendly neighbors or enemies too close for comfort. A German bomber squadron based on Trondheim, Norway, could, by flying approximately the same distance, drop bombs on airplane factories at Seattle, the railroad freight yards at Chicago, or the capitol at Washington.



Courtesy Consolidated Valtre

Over the top of the world man wings his uninterrupted way.

The global concept of geography has already made a profound change in our whole geographical outlook. Instead of thinking exclusively in terms of eastern and western hemispheres, with the land masses in each separated from those in the other by thousands of miles of water, and the north polar region nothing but a vast expanse of ice and snow, we have now come to realize that the great part of the land masses of the earth are in the northern hemisphere, that they are ringed about the north pole, and that they are only a few short flying hours from each other. The ice, the snow, and the sub-zero temperatures that have proven almost insurmountable barriers to the navigator are not insuperable factors to the airman. In fact, the ice cap is in some respects a help rather than a hindrance, because there are no great elevations to surmount, and it may become an emergency landing field.

The stratosphere at the north pole. The stratosphere, that higher region of the air which is not affected by our terrestrial storms, is $4\frac{1}{2}$ miles above the earth at the north pole, whereas at the equator it is 11. The temperature of the stratosphere at the north pole is only about -57° F. and at the equator -112° F. It has been hinted that some of our "lend-lease" goods have been flown over the arctic region to Russia during the winter of 1942-1943. Not until the war is over will the truth be revealed.

The new outlook. Neither the geographer nor the man in the street is to be derided because he has been slow in recognizing and accepting the fact that he need no longer confine himself to an east-west twirling "merry-go-round," but that he can now "loop-the-loop" over the north pole. Our arrival at this present-day world outlook has been achieved after hundreds of years of trial and error, exploration, and discovery. Progression to this point has been slow and arduous. It is a great tribute to the faith, ingenuity, and persistence of man that it has at last been accomplished. The future holds still greater promise.

GUIDES TO STUDY

1. What does the word "Mediterranean" mean? In ancient times why was it a suitable name for the great sea between Europe and Africa?
2. Look at the north polar map (p. 5) and tell why the name "Mediterranean" might well be applied to the Arctic Ocean and the North Atlantic Ocean.
3. The old Mediterranean Sea was really a cradle for navigators. It required hundreds of years of practice in this relatively quiet sea before sailors dared brave the dangers of the broad and stormy Atlantic. What advantages had the Mediterranean for early navigators?
4. Why for so many years was the Arctic Ocean a forbidding sea? How has the polar region finally been overcome?
5. What is the stratosphere? What advantages has the stratosphere over the pole as compared with that over the equatorial regions? (See p. 31.)
6. State all the advantages offered by the polar region for airplane flights. Why has the "dreaded" Arctic come to be called the "friendly" Arctic?
7. Compare the time taken by air with that taken by ship between distant places. What great advantage has the plane? Do you think of any disadvantage as compared with the ship?
8. In the future what kind of cargo is likely to be carried by plane and what kind by ship? Before the beginning of World War II what did planes carry chiefly besides passengers?
9. What parts of the world must depend quite largely on the airplane? Why?
10. How is aviation helping to win the war? How may it help to keep the peace?

TOPICS FOR CLASS DISCUSSION

1. Early navigation of the Old Mediterranean.
2. Early navigation of the New Mediterranean.
3. The height of the stratosphere.
4. The speed of airplanes.

WORK TO BE DONE

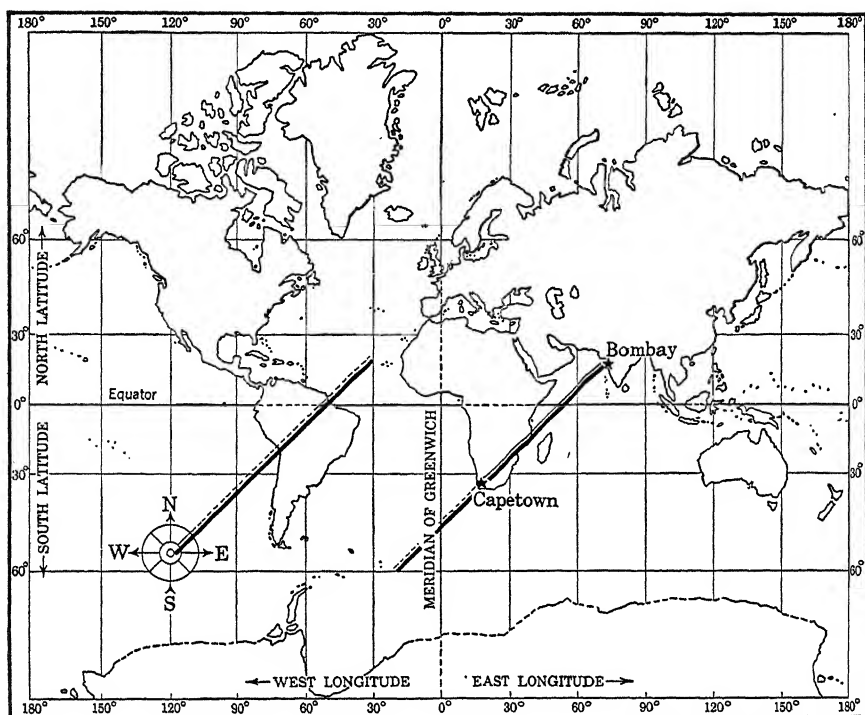
1. Study the north polar map and tell the advantages of the polar routes as compared with east-west routes.
2. Pass a string around the globe at the equator. Cut the string so that it just reaches around the globe. Call the length of the string 25,000 miles. Tie a knot in the string dividing it into two equal parts. Then using the string find the distance between any two places on the globe. Find distances over the north pole as compared with distances between the same places east and west.
3. Find the time required to fly between any two places by dividing the distance by 300 or by any speed you wish to choose for your plane. If the distance is 3000 miles and the rate of the plane is 300 miles per hour, then the time of flight between the two places is ten hours.

3. FROM THE MERCATOR MAP TO THE POLAR MAP

Old maps and new. For centuries geographers have tried to draw plans or make maps of the earth or at least the part of the earth they knew at the time. An attempt to portray on a flat surface the whole or a part of the earth's curved surface is known as *map projection*. Early civilizations centered about the Mediterranean Sea, hence, as might be expected, the early maps had to do mainly with regions bordering that sea. Moreover, other parts of the world were not known at all or were not known well enough to be included in the early maps.

Even after the voyages of Columbus and other early explorers which proved the earth to be a sphere, the chief interest lay in east-west routes. For centuries trade routes extended through countries bordering the Mediterranean east to China and the Indies on the one hand and west to northwestern Europe on the other. For this reason it is easy to understand why early mapmakers devoted their time and interest to plotting a central belt around the earth giving little attention to regions to the north or to the south. Of those lands and waters they knew little and were interested in them only as they might provide shorter routes between the East and the West.

The Mercator map. One of the maps which served the purposes



Courtesy Consolidated Vulcan

The Mercator projection has one big advantage: it shows true compass directions. Since all meridians and parallels on a Mercator projection are shown as straight lines crossing each other at right angles, a compass course between any two points is a straight line connecting them.

of the times was drawn by Mercator,¹ who lived in the sixteenth century and whose name is associated today with the projection which he had developed. The Mercator projection represents the meridians as parallel lines instead of converging to the poles as they do on a globe. The result is a map showing the earth with a circumference at the poles the same as the circumference at the equator. The distance around the earth at the equator is about 25,000 miles, while at the poles it is really zero. To give the right proportion the distances between parallels are increased from the equator toward the north and toward the south. As a result, any area at latitude 60° is shown as four times as large as a similar area near the equator.

The imperfections of the Mercator projection should be understood. Not only are land and water areas at different latitudes greatly out of proportion, but distances between regions are greatly

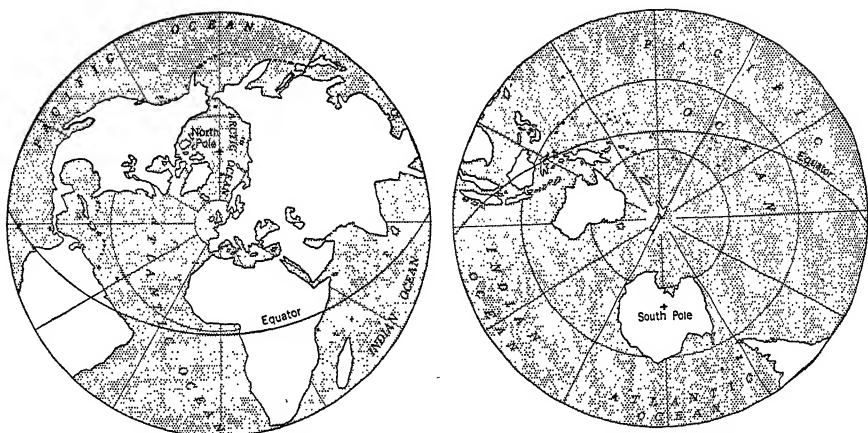
¹ Gerhard Kremer (1512-1594), a Flemish geographer.

exaggerated. These imperfections can best be realized by comparing a Mercator map of the world with a globe. Compare, for instance, on each the relative sizes of Greenland and South America. Note the arrangement of the continents about the north pole on the globe.

The Mercator projection has one distinct advantage: it does show true compass directions. On a map of the Mercator projection a compass course between any two points is shown by a straight line connecting them. For this reason the Mercator projection is a useful map for navigators.

Polar-projection maps. Disadvantages of the Mercator projection have long been known. With increased knowledge of the polar regions and with the appreciation of the advantages of flights over the north pole and above Arctic lands and waters, more and more attention has been given to polar map projections (p. 5). The polar projection, like the globe, shows the northern continents grouped about the Arctic Ocean in their true relative positions. It should be remembered that no representation of any large area of the earth's surface can be accurately drawn on a flat surface. The polar map, like the Mercator, presents difficulties in accurate representation. The farther it extends from the pole the less and less accurate it becomes as regards area, shapes, and distances. It is well to remember that the continents grouped about the north pole contain the leading industrial and commercial peoples of the world. The shortest airplane routes connecting these countries pass over the polar regions, and, in some cases, the north pole itself. For this reason the use of the north polar projection map is constantly increasing.

Land and water hemispheres. Since for air-age thinking no flat map can correctly represent large areas of the earth's surface, we must depend more and more on the globe for getting a correct understanding of the relationship of the continents and water masses which make up our sphere. In conjunction with the globe it will be necessary, however, to have maps, many of them hemispherical. Our old maps of the hemispheres were determined by mathematical geography. The equator halfway between the poles divided the earth into northern and southern hemispheres, and a great circle passing through the poles divided it into eastern and western hemispheres. For map-making purposes, however, it is not necessary for the geographer to confine himself to those old hemispherical divisions. As it is possible to bisect an orange vertically, horizontally, or obliquely, so it is possible to divide the earth's surface in any number



The land hemisphere, while it includes approximately six sevenths of all the land, is more than half water; the water hemisphere, with about one seventh of the land surface of the earth, is about fourteen-fifteenths water.

of ways. For instance, the surface of the earth can be so divided that one hemisphere will include practically all the land masses of the earth; the other hemisphere, the ocean areas. Such a land hemisphere centers around a point near London instead of the north pole and the great circle which forms the boundary, while it must be called an equator since it divides the surface of the earth equally, is not the equator established by the rotation of the earth. Such a map projection will find a permanent place in our global geographies because the land areas, the inhabited regions of the earth, have more interest for us than the water areas. It is going to be increasingly important in this air age to learn a great deal about our nearest neighbors. In addition, such a map makes us realize that the nations of the earth are living in *one world* and not in two widely separated hemispheres.

GUIDES TO STUDY

1. Why were the early trade routes very largely east-west routes? Why did they center so largely around the Mediterranean Sea?
2. Study carefully the Mercator map (p. 11). Note the meridians (north-south lines) and compare them with the meridians on the globe. The circumference of the earth at the equator is about 25,000 miles. What is the true circumference at the north pole? Note the globe (which is correct) and then compare with the Mercator map. According to Mercator the distance around the earth is just as great at the poles as at the equator.
3. Compare the size of Greenland with that of South America, first on the globe and then on the Mercator map. Explain.
4. What great disadvantage then has the Mercator map? What great advantage has the Mercator map?

5. Study again the north polar map. Note the relative positions about the north pole of North America, Europe, and Asia. Now compare the Mercator map with the polar map and with the globe for the positions of the northern continents.

6. What parts of the polar map show the greatest inaccuracies of shape and distance? What advantages has the polar map? Why is it receiving a great deal of attention just now?

7. Why does the aviator prefer the polar map to the Mercator?

8. See the maps (p. 13) showing the earth divided into land and water hemispheres. What advantage have maps like these?

TOPICS FOR CLASS DISCUSSION

1. The Mercator map and the north polar map.
2. The earth's hemispheres.
3. What a map tells.
4. Why newspapers and magazines use maps.
5. Why motorists use maps.
6. Difference between a map and a picture.

WORK TO BE DONE

1. Review the discovery of America and report to the class the ideas of Columbus as to the size and shape of the earth. Find if you can a map of the type Columbus was obliged to use.

2. From your history textbook review and report to the class the attempts made to find routes to the Far East north of Europe and north of North America, that is, by way of a northeast passage or by a northwest passage.

3. State definitely what is meant by each of the following terms: northern hemisphere, southern hemisphere, land hemisphere, water hemisphere. List the land and water areas included in each of the hemispheres named.

UNIT II. THE EARTH IS A SPHERE

Since no flat map can adequately represent other than small areas of the earth's surface, we must depend more and more on the globe for getting a correct understanding of the relationship of the continents and water masses which make up our sphere. Of course we can have an infinite number of hemispheres so long as we divide the earth by a plane passing through its center. Wherever such a plane intersects the surface of the sphere, we shall have a great circle or in fact an equator though by agreement this term has been limited to the intersection of the plane through the center of the earth perpendicular to the polar diameter and equally distant from the two poles. An examination of a globe will show that the so-called northern hemisphere contains about three fourths of all land masses, in which reside about nine tenths of the total population of the earth. If, however, instead of using the north pole in the middle of the Arctic Ocean as a center we think of some place in southwestern England or southern Ireland as the pole of the hemisphere, we shall have even more of the land area of the continents and islands included in what we can call the land hemisphere of the earth (see p. 13). In such a case we would have the water hemisphere centering about New Zealand as a pole (see p. 13). The land hemisphere includes approximately six sevenths of all the land, but still it is more than half water; the water hemisphere with only about one seventh of the land area is approximately fourteen fifteenths water. In other words the land masses in this hemisphere practically form a world island variously intersected by water but including all the continents except Australia, southern South America, and a small part of southeastern Asia.

The earth is a planet. Now you know that our earth is one of the nine planets belonging to the solar system. A planet has three characteristics: (1) it has a fixed axis; (2) it has a uniform motion about this axis, which we call its rotation; (3) it has an almost uniform movement in space about the sun, which we call its revolution.

The earth turns. We have already learned that the earth is a sphere—that men sailed around it from east to west and from west to east. Modern airlines encircle it in the same directions. Daring explorers in the early part of the present century discovered both the north and south poles. Amundsen and Byrd have each visited both poles. Just what are the poles of the earth? They are the ends of

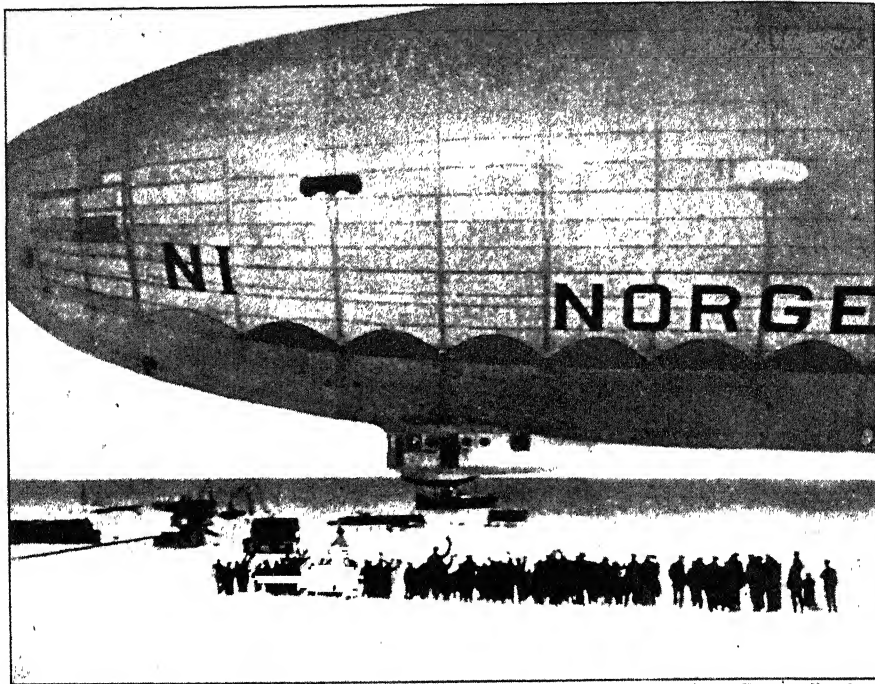


Photo from Brown Brothers

Road Amundsen's airship. This is a dirigible, an aircraft lighter than air. In the airship *Norge* Amundsen and General Nobile, an Italian, flew from Spitzbergen (Svalbard) over the north pole to Alaska. Before this trip Amundsen had been the first person to reach the south pole.

the invisible axis about which the earth turns. We call this turning the *rotation* of the earth.

1. THE EFFECTS OF ITS ROTATION ON ITS AXIS

What rotation means to us. Because the earth turns from west to east, the sun, the moon, and stars pass across our sky from east to west. We say the sun rises in the east and sets in the west, but we realize it is really due to the movement of the earth which is on its daily round from west to east. It is this turning of the earth that gives us our day and night which we divide into twenty-four hours. No other method has been found for measuring time so easily and accurately.

If you will look at your classroom globe you will see that its axis is not vertical or straight up and down, but it is inclined, or tilted, at an angle of about $23\frac{1}{2}^{\circ}$ from the vertical. Where the axis intersects the surface of the globe we have two points which only spin; these are the two poles, north and south pole. Any plane passing through the poles necessarily contains the axis and intersects the

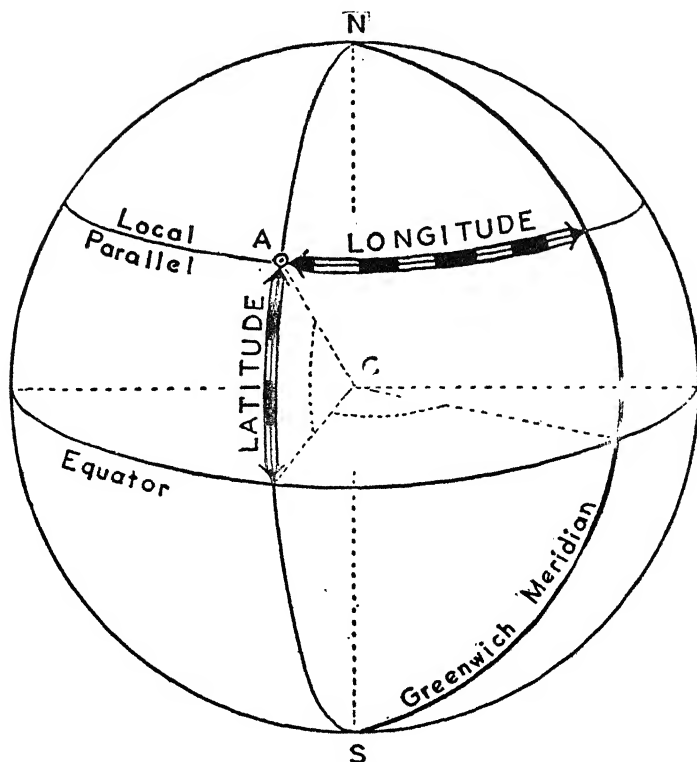
sphere in a great circle. An infinite number of such intersections can exist and each great circle is called a *meridian*. If all meridians are bisected, or cut midway between the poles, and the points where they are cut are connected by a line, this line will divide the surface of the globe into two equal hemispheres. It is therefore called the *equator*.



The globe is not a map but a scale model of the earth which accurately shows the shape and relative size of all areas and the true distances between them.

Great circles. Any circumference that divides the surface of the earth into two equal parts is a great circle. The equator and the meridians are such circles. Since a plane may pass through the center of the earth in any direction, great circles may be thought of as extending about the earth in all directions. The important thing for us to know is that the shortest distance between any two points on the earth's surface is along the line of a great circle. Ship captains have followed great-circle routes whenever possible for many years. But the pilot of a plane, unlike the master of a ship, need not turn aside for land barriers or frozen seas. He can follow a great circle over mountains, jungles, or Arctic seas between take-off and landing.

Latitude and longitude. Since a circle, great or small, contains 360 degrees, the equator furnishes a base line at all points 90 degrees from the poles. Therefore the position of any place can be given by saying it is so many degrees north or south of the equator. Although this distance could also be expressed in linear measure as so many miles, it is more geographic to use angular distance measured in degrees, minutes, and seconds. Angular distance so measured is called the *latitude* of the place. We say that all places on the equator are in 0° latitude. But since any number of places around the earth may have the same latitude because they are the same number of degrees north or south of the equator, they must be on a smaller circle whose plane is parallel to the plane of the equator. There can be an infinite number of such planes, and where any of them intersect the surface



From Bauer's "Globes, Maps, and Skyways"

we have *parallels of latitude*. To say that a place has a latitude of 10° N. does not tell us its position. It simply puts it in a circle 10° N. of the equator. We therefore have to locate it by means of its meridian, one of the great circles passing through the poles.

Just as we had to have a base line, the equator, from which to measure angular distance to obtain latitude, we must have a base line from which to determine a place's position on its parallel of latitude. Because all meridians have the same characteristics, *i.e.* they are all great circles passing through the poles from which they radiate like the spokes of a wheel, an arbitrary selection had to be made of one from which angular distances could be measured east or west, in other words, one to be 0° meridian.

By international agreement the meridian passing through the so-called passage instrument in the Greenwich Observatory, near London, England, was selected as the 0° meridian. From this meridian the other meridians are numbered east and west up to 180° . A look at a globe will show you that the meridian 180° E. or W. of Greenwich lies almost entirely in the Pacific Ocean. The angular distance of any place on the earth measured in degrees from the Greenwich

meridian along the equator or any parallel is known as its *longitude*. Thus by the use of these two sets of circles—the parallels and meridians—the position of any place can be given exactly; in other words we have two sets of circles perpendicular to each other.

It must be remembered that these two sets of circles are imaginary and are not found on the earth but are a part of man-made geography which appear on globes, maps, and charts to aid our understanding. While you have been told that the number of possible parallels and meridians are infinite in number, on our globes and maps they are shown only at convenient intervals, such as every 5, 10, 15, or 20 degrees.

It is important to remember that:

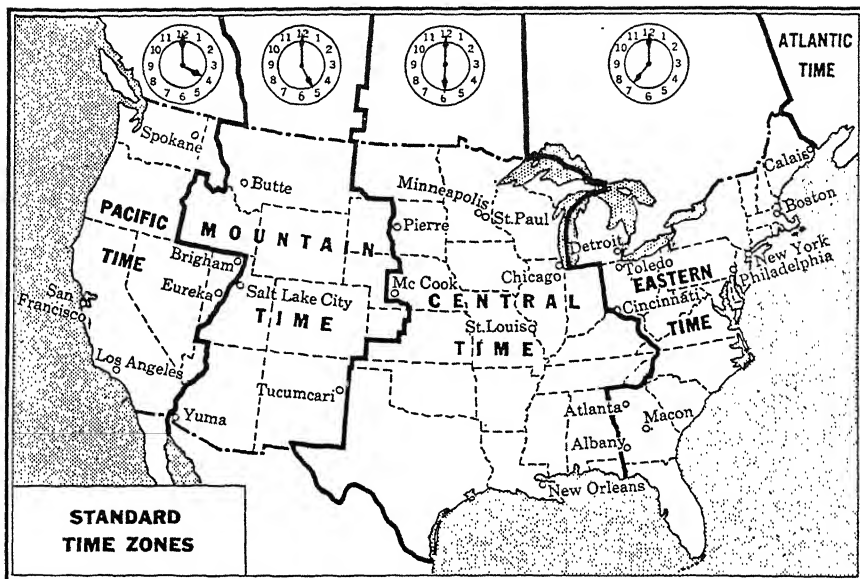
Latitude is the distance of a place from the equator (0°) measured in degrees, minutes, and seconds along its local meridian (north or south).

Longitude is the distance of a place from Greenwich meridian (0°) measured east or west in degrees, minutes, and seconds along its parallel or along the equator to its local meridian.

By giving both the latitude and the longitude of a place we can tell exactly where it is on a map. When a ship at sea is in distress it radios for help and of course gives the latitude and longitude. If, for instance, the captain gives the position of his ship as 25° N. latitude and 80° W. longitude, he would be off the southeastern tip of Florida directly south of Miami (see color map, Plate 3 in Appendix).

Likewise the pilot of a plane flying over the ocean must know his latitude and longitude. In case of engine trouble or other difficulties he must call for help and give his location. In determining his location he will make use of the sun, the stars, and the various instruments with which his plane is equipped.

The relation between longitude and time. The earth rotates, or turns on its axis, from west to east, corresponding exactly to the apparent motion of the sun which seems to rise in the east and set in the west. As the earth makes one complete rotation in 24 hours, any place on the earth describes an arc of 360° . In one hour any place on the earth's surface will describe an arc of 360 degrees divided by 24, or 15 degrees. When the sun passes over the 0° meridian at Greenwich in its apparent east-west motion, it is 12 o'clock noon. It is 12 o'clock noon at another place when the sun passes over that place's meridian. Hence there exists this relationship between longitude and time: the difference in time between Greenwich noon and local noon depends on the difference in degrees between the meridian at Greenwich and the local meridian.



In which standard time zone of our country do you live?

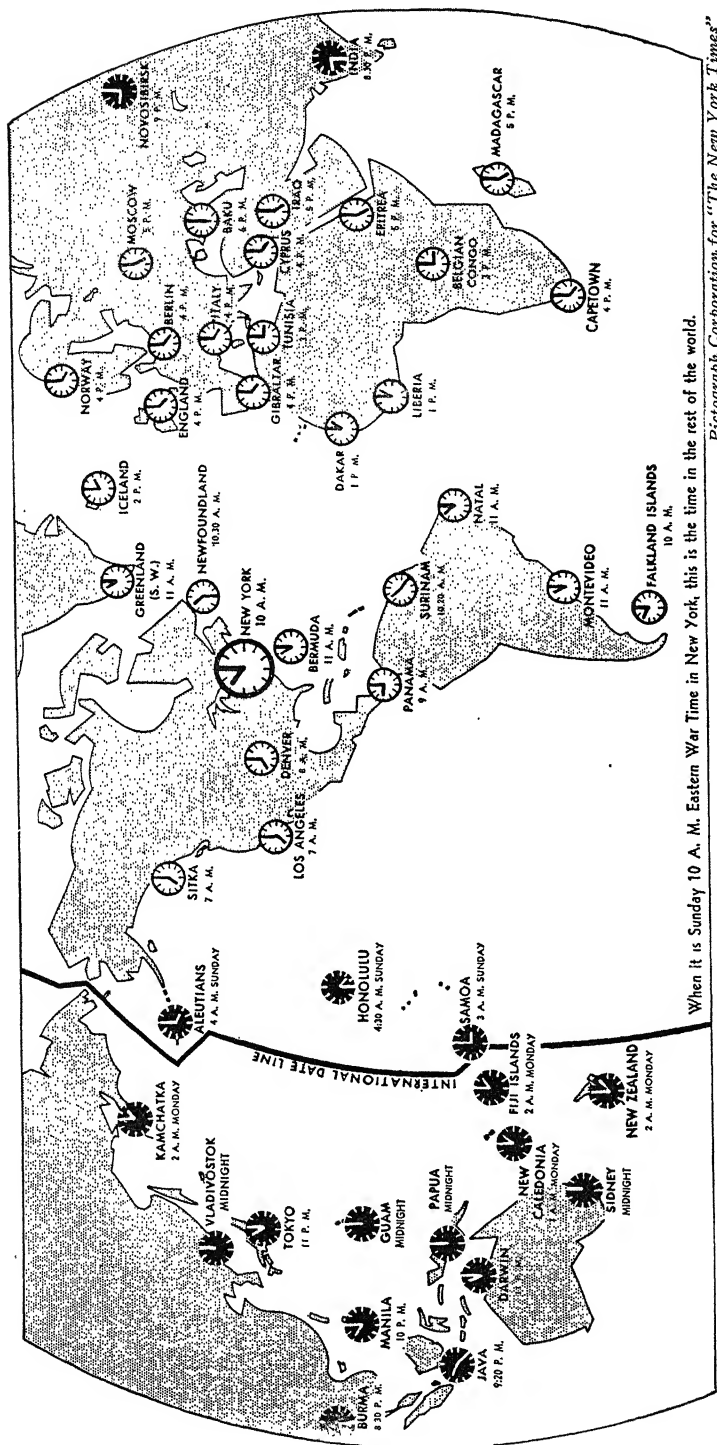
Let us take a concrete example: If we know that the difference between Greenwich noon time and Philadelphia noon time is 5 hours, this indicates that Philadelphia is 5 hours east or west of Greenwich. We know, however, that it is west. We can convert this 5 hours of time to degrees of distance by multiplying each hour by its equivalent, 15° of longitude: $5 \times 15^\circ = 75^\circ$ which is the difference of longitude. Since Greenwich is 0° longitude and Philadelphia is west of Greenwich its longitude will be approximately 75° W. Look at your globe to verify this answer.

The longitude of a place is east if local noon occurs before Greenwich noon; it is west if local noon occurs later than Greenwich noon.

Standard time zones. You will note that latitude has no connection with time but that longitude and time are intimately connected.

This fact made possible the adoption and use of standard-time zones. A traveler from an eastern city going west on one of our transcontinental trains will probably be told by the Pullman porter to set his watch back an hour when he reaches Toledo because he is about to leave the eastern time zone and enter the central time zone. At North Platte, Nebraska, he would have to set his watch back another hour because he is entering the mountain time zone, and at Ogden, Utah, he would have again to lose an hour because from there on to the coast he would be traveling in the Pacific time zone.

If the President broadcasts from Washington, D. C., at nine



When it is Sunday 10 A. M. Eastern War Time in New York, this is the time in the rest of the world.

Pictograph Corporation for "The New York Times"

This map shows the relative time of day or night all over the world at one instant. Remember that day moves around the world from east to west. Notice that a person crossing the Date Line from west to east finds his time changed from Monday to Sunday thus re-creating a day, but if he passes from east to west he would find his time changed immediately from Sunday to Monday thus losing a day. This map has been checked for accuracy by the United States Government.

o'clock on Wednesday evening, eastern standard time, it is heard in Chicago at eight o'clock and in San Francisco at six o'clock. If London is listening in, it will be 2 A.M. Thursday there.

These changes of time in our country have been brought about because of the great east-west extension of our country or the difference in longitude between our east coast and our west coast. The latitude of the United States makes no difference as you can see by looking at the map (p. 20) where the boundaries of the time zones have an irregular general north-south direction. The time in any zone is roughly sun time at the meridian in the middle of the zone and therefore for all places approximately $7\frac{1}{2}^{\circ}$ on each side of this meridian. Since as you have learned 15° of longitude correspond to one hour of time, you will understand why the traveler's watch must be set back one hour each time he passes out of one time zone into the next. Of course, he will have to reverse the process and set his watch forward an hour each time when he starts back east again.

The International Date Line. For convenience such standardization of time has been adopted by every civilized country on the globe. The relative time differences may be seen in the world map on page 21. This map also shows the International Date Line which we will need to explain.

If an aviator were to start from Quito, Ecuador, on Christmas Day at sunrise and were to fly westward at a rate of a little over 1000 miles an hour, it would always be sunrise where he was. In 24 hours he would be back at Quito having flown around the world at the equator. It would still be sunrise, but he would have seen no darkness. It would be December 26 at Quito and the aviator would have *lost* a day.

If, however, he had flown eastward at the same rate on December 25 at sunrise, in 12 hours he would have seen the sun rise again. When he reached Quito again, he would see the sun rise for the second time. He would have seen two periods of daylight and two periods of nighttime, but the people at Quito would have seen only one period of each. So the day of his return should be December 27 according to the aviator's count, but it would be only December 26 in Quito. The aviator had *gained* a day.

The confusion of dates occurs whenever a traveler goes around the world regardless of his mode of travel. To avoid this difficulty the nations have agreed upon the International Date Line, which corresponds roughly to the 180° meridian, as the place to change dates. If a traveler crosses this line on Saturday going westward, he will

lose Sunday and the day following the crossing will be Monday. If he crosses on Sunday going eastward, the following day will also be Sunday.

GUIDES TO STUDY

1. What is meant by a great circle? We should remember that on a globe or on the earth the shortest distance between any two points is always along the line of a great circle.

2. The sun and the planets (of which the earth is one) together with their satellites or moons make up the solar system. From what do all the planets receive their light and heat?

3. Define rotation of the earth. Define revolution of the earth. What is the effect of each?

4. What are the poles of the earth? As the earth rotates what motion, if any, takes place at the poles? If you could stand at the north pole while the earth made one complete revolution how would your body be moved? At the same time how far would a person at the equator be moved?

5. Why does the sun rise in the east and set in the west? What is the cause of day and night?

6. Why is our day just twenty-four hours long?

7. Where is the equator? What is its position in relation to the two poles? It is called the equator because it divides the earth into equal parts. Other great circles extend north and south and pass through both poles. These are known as *meridians*.

8. Why does a ship captain follow great circles when possible? Why can he not always follow a great-circle route?

9. Why would the pilot of a plane give more attention to great-circle routes than the master of a ship?

10. How is latitude reckoned? How definitely does it locate a place?

11. How is longitude reckoned? What is the meridian marked 0° ? It is also called the prime meridian. How definitely does longitude locate a place?

12. In what directions is longitude reckoned? How far in each direction? Why?

13. Show that by means of both latitude and longitude a place can be located exactly.

14. The earth makes one complete rotation in twenty-four hours. There are 360 degrees in any parallel (circle around the world—east to west). If any point on a parallel makes a complete rotation, that is, moves through 360 degrees in twenty-four hours, through how many degrees will it move in one hour? There is then a difference of one hour for every fifteen degrees of longitude.

15. Because the earth turns from west to east, sunrise, noontime (when the sun is over our meridian), and sunset seem to move around the earth from east to west. A place 15 degrees east of us will have sunrise how much earlier than we do? If it were 45 degrees east? How would its noontime compare with ours if it were 30 degrees west of us? If it were 90 degrees east of us? If it were 60 degrees west of us?

TOPICS FOR CLASS DISCUSSION

1. What are the effects of the earth's rotation?
2. Who was the first to reach the north pole? The south pole?
3. When does the moon rise and set? (See any almanac.) In what direction does it rise?
4. At what times is a certain broadcast heard in different parts of our country? In different parts of the world?

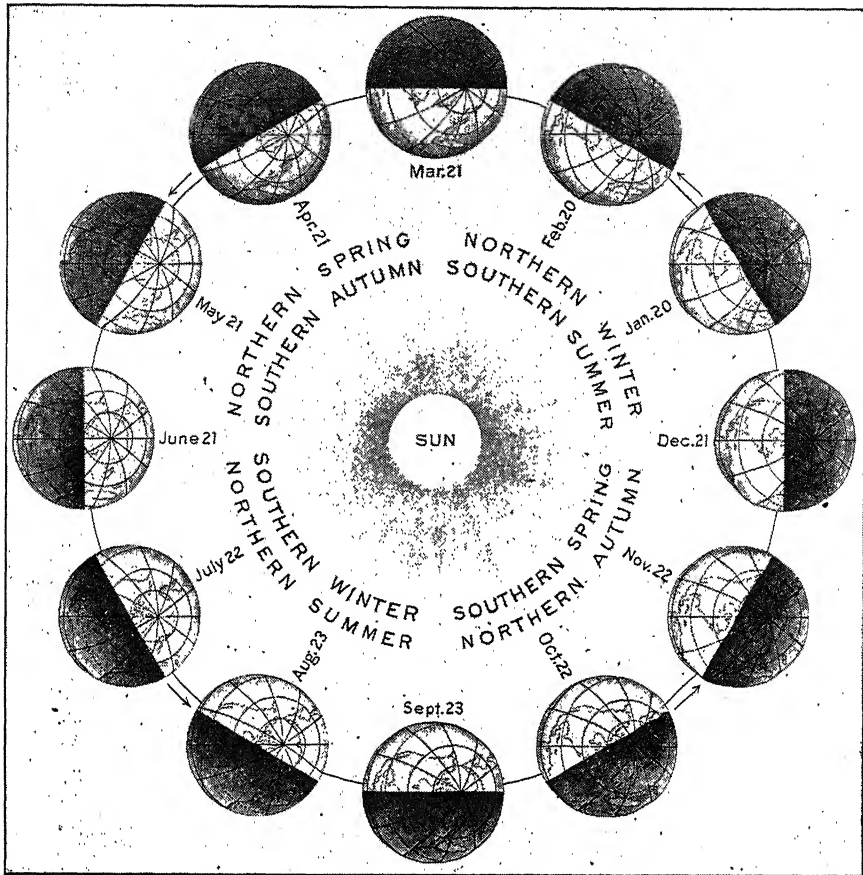
WORK TO BE DONE

1. Connect any two places on a globe with a string. This is the shortest distance between the two points and the string lies along the line of a great circle. We have already learned that we can find the length of the string in miles by calling the distance around the globe at the equator 25,000 miles. Find distances between places on the globe in this way and compare them with distances found by using the scale of miles on your map.
2. Find on the globe or on your map the latitude and the longitude of each of the following places: Buenos Aires, Calcutta, New York City, Naples, Honolulu, Adelaide, Moscow, Wellington, Rio de Janeiro. Which are in the northern hemisphere? Which are in the southern hemisphere? Which are in the Old World? Which in the New World?
3. Turn to the map of the time belts and explain it. Learn the name of each belt. Which belt has sunrise first? Which has the midnight of July 4 last?
4. In the United States the time of the belts is that of the meridians numbered 75° , 90° , 105° , and 120° . When it is 9 A.M. in the eastern belt, what time is it in the other belts? When it is 12 noon in the central belt, what time is it in each of the other belts? What time is it in London? What time is it in Moscow?

2. THE EFFECTS OF ITS REVOLUTION IN ITS ORBIT

Change of seasons. In addition to rotating about its axis the earth also moves around the sun. This movement called the revolution of the earth requires about $365\frac{1}{4}$ days and gives us another division of time, our year. This yearly movement is also one factor in giving us change of seasons. We must think of the earth as moving about the sun with its path always in a certain plane. (See p. 25.) If the earth's axis were perpendicular to this plane, there would be no change of seasons as a result of revolution.

As a matter of fact the earth's axis makes an angle of about $23\frac{1}{2}^{\circ}$ with the perpendicular to the plane of its path. Furthermore, the axis of the earth always points in the same direction—the north pole of the axis toward the north star. Then when the earth is on one side of the sun, the north pole of the axis will be inclined toward the



This diagram shows the relative positions of the sun and the earth at the time when each season begins and the position of the vertical rays in each instance.

sun. At that time the northern hemisphere will be having summer and the southern hemisphere winter. When the earth is exactly on the opposite side of the sun, the north pole of the axis will tip away from the sun and the northern hemisphere will have winter and the southern hemisphere summer.

The heat of summer and the cold of winter. We do not need to be told that we have warm weather in summer and cold weather in winter. This is not because the earth is nearer the sun in summer. In fact the earth is nearest the sun in January and farthest from it in the month of July. The greater heat of summer is due to two causes. When the north pole tips toward the sun, the rays of the sun strike the earth less obliquely than in winter. (See diagram, above.) For this reason the rays are concentrated and thus give more heat to a given area. Besides, the days are longer than the

nights. Thus the earth has a long time each day to get warm and a short time to cool off. We cannot see the change in the direction of the rays, but we all notice that the sun is much higher in the sky at noon in summer than it is in the winter. If we are careful to observe sunrise and sunset when the days are long in summer, we shall find the sun rising far to the north of east and setting far to the north of west. In winter we shall see it rising to the south of east and setting to the south of west.

We have our longest days about June 21 and the shortest days about December 21. We call these dates the summer and winter *solstices*. About March 21 and September 23 the north pole of the axis points neither toward the sun nor away from it. These dates we call the *equinoxes*. On these dates the sun rises directly in the east and sets directly in the west, and days and nights are equal throughout the world.

GUIDES TO STUDY

1. Why is our year $365\frac{1}{4}$ days long?
2. What do we mean by the plane of the earth's path or orbit? See diagram p. 25.
3. How is the north pole of the earth tipped with reference to the sun in our summertime?
4. In our summertime how do the rays of the sun strike the earth in the northern hemisphere? Why does this bring us warm weather? See diagram p. 25.
5. When the north pole tips towards the sun, how does the south pole tip with reference to the sun? What kind of weather does that bring to the southern hemisphere? Why?
6. The axis of the earth always points in the same direction. How then can the north pole of the axis of the earth slant toward the sun in summer and away from the sun in winter? See diagram p. 25.
7. How does the time of summer and winter in the northern hemisphere compare with the seasons of the southern hemisphere? Why?
8. How does the length of our day (period of sunlight) in summer compare with that of winter? How does that help to make our summers warmer than our winters?
9. How does the length of day in winter compare with the length of night? How does this affect winter temperatures?
10. Give two reasons explaining why our summers are warmer than our winters.

TOPICS FOR CLASS DISCUSSION

1. Effects of change of seasons on farm life.
2. How does change of seasons affect sports? Summer sports? Winter sports?
3. List other effects of change of seasons.

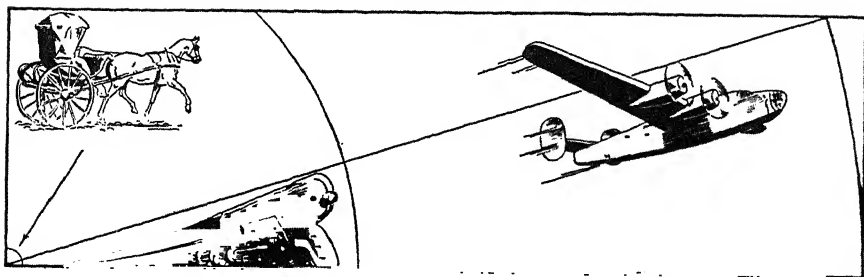
4. How differences in length of days in summer and winter affect our lives. Daylight-saving time for instance.
5. Length of day and night at the north pole. At places near the Arctic circle.

WORK TO BE DONE

1. Take a ball or small globe which may represent the earth and move it slowly around a larger globe or a lamp which may represent the sun. Keep the axis of the small globe pointing always in the same direction. Show how the direction of the axis plus the revolution of the earth around the sun brings about change of seasons.
2. Examine the diagram on page 25. Notice how much of any given parallel is in the sunlight in the summer and how much of the same parallel is in the sunlight in the winter. What does this tell of the length of day in summer as compared with winter?
3. From an almanac learn on what days the seasons change.
4. Note in the newspapers any reference to change of seasons. For instance, the winter supplies of coal or oil; the canning of fruits and vegetables; insulation of homes; refrigeration, etc.
5. Note any reference to tropical hurricanes in the Caribbean region which occur in late summer and early autumn.
6. Note advertisements of wearing apparel in different seasons.

UNIT III. THE OCEAN OF AIR

I. THE OCEAN ABOVE US



Courtesy Consolidated Value

In twelve hours a man in a horse-drawn buggy could travel from his home to a point on the innermost arc of a circle (see arrow). By non-stop express train he could reach a point on the second arc. But in a modern long-range transport plane at the end of the day he would reach a point on the outermost arc. Thus the earth has shrunk.

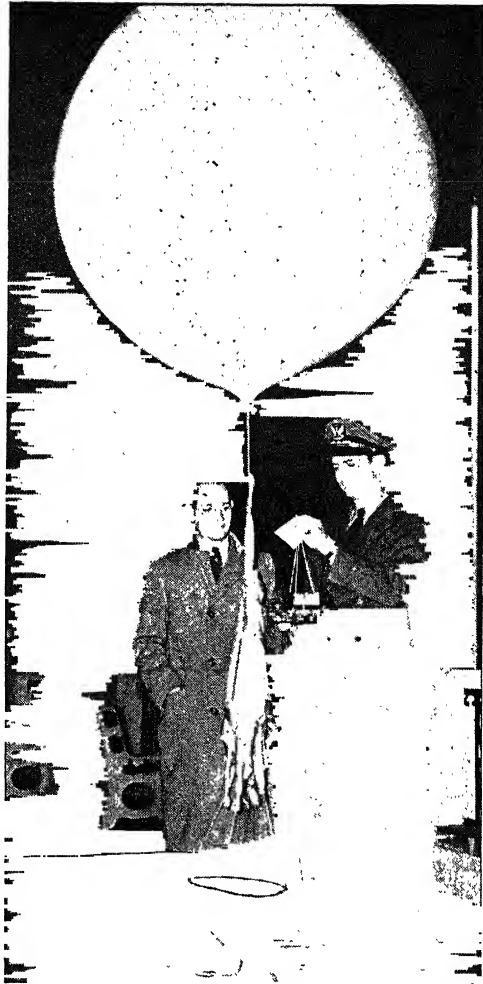
What the atmosphere means to us. The air is all about us. Many of our everyday expressions are based upon it. A certain commodity is "as free as air"; another is "as light as air"; at times we feel as if we were "walking on air." The air we breathe is essential to all forms of plant and animal life including that of man. The ocean of air about us helps to keep the earth warm by acting as a blanket to retain the heat received from the sun. The atmosphere, its constituents, varying temperatures and movements are the basic elements of our weather. No topic of conversation is so common as that of the weather. Mark Twain said, "Everybody talks about the weather, but nobody does anything about it."

We live upon and move over the surface of the land. We sail on the surface of the seas, but we live and move about mainly at the bottom of the ocean of air. It is only by means of airplanes and dirigibles that we rise above the depths of the air and move about in it. Civilized peoples have lived upon the earth for thousands of years, but it was not until the present century that man learned how to use his ocean of air as a medium for communication and transportation. Distances once covered by trains and ships in weeks or months are now traversed by planes in hours or days. The earth becomes smaller as distances become shorter. Peoples once far apart are brought close together in time and space. For this reason people must learn to live together in peace; otherwise civilization will be blotted out. This follows from our greater knowledge of our ocean of air and our ability to make use of it.

What is in the air. The atmosphere is composed chiefly of nitrogen and oxygen, four parts of the former to one of the latter. Another constituent of the air is carbon dioxide, a substance which forms the warmest part of the atmospheric blanket. The greater part of this heavy gas lies comparatively near the surface of the earth and plays a large part in preventing the radiation of heat from the earth's surface.

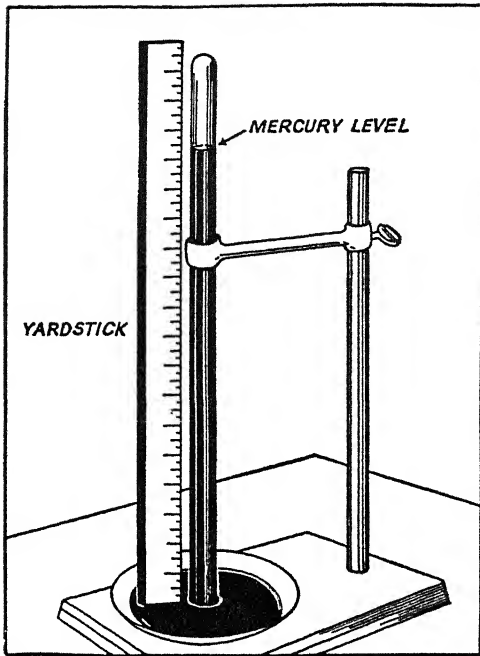
Another substance making up a part of the atmosphere is water vapor. The quantity of moisture in the air varies greatly in different places and at different times in the same places. The presence of moisture which falls to the earth in the form of rain or snow is necessary for the existence of all forms of plant and animal life. Water is essential for the growth of plants, and animals depend upon plants for their food. Man, in turn, looks to plants and animals as sources of practically all his food and clothing.

Depth and pressure of the air. The bottom of the ocean of air is where it rests on the continents and the oceans. It is not easy to tell just where the top is. The greater the distance above the earth's surface, the thinner the air becomes. The air, like all other substances, has weight. The weight of all the air finally rests upon the earth and each layer of air supports all the air above it. See the graph of atmospheric pressure on page 31.



Courtesy United Air Lines

A radiosonde is attached to a hydrogen-filled balloon for reporting weather aloft. This instrument not only records pertinent weather data but transmits the information by radio to weather stations.

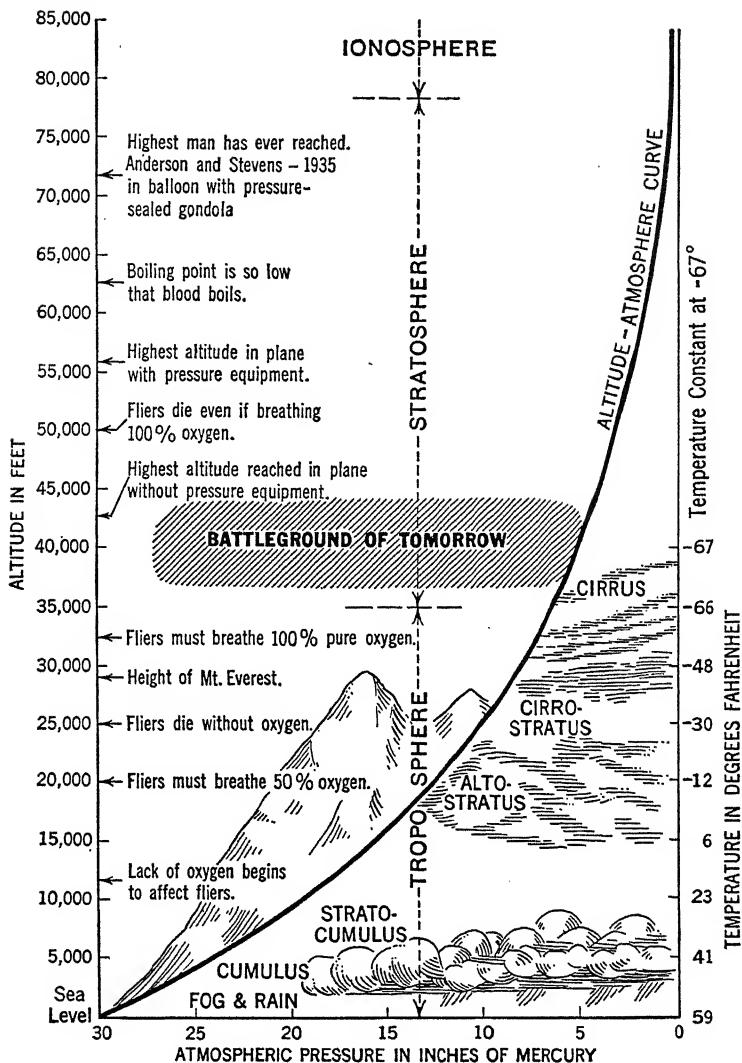


This simple barometer is made by filling a glass tube about thirty-six inches long with mercury. The tube is inverted without allowing any of the mercury to escape and the open end dipped into a small cup containing mercury. The mercury in the tube falls until the upper level is about thirty inches above the level of the mercury in the cup leaving a vacuum at the top of the tube. The mercury is held at this level by the pressure of the atmosphere on the mercury in the cup. When the atmospheric pressure increases, the mercury rises in the tube; when the pressure is less, the mercury falls to a lower level in the tube.

The pressure of the air upon the earth at sea level is about 14.7 pounds per square inch. Since a gas presses equally in all directions, at sea level all parts of a person's body receive this degree of pressure. The body of a person ordinarily living near sea level becomes accustomed to the air pressure of that level. The body has developed an internal pressure corresponding to that of the air outside. As one rises to higher levels, one experiences discomfort which increases as the elevation increases.

The atmosphere at varying levels. The layer of air lying next the earth is a layer of winds and storms offering many difficulties to the aviator. The height of this layer, known as the *troposphere*, varies with the latitude. Near the equator the upper level is perhaps ten or eleven miles above the surface of the earth. Near the north pole the stormy troposphere is only four and one half miles deep. Above the troposphere is the *stratosphere* where the air is free of storms. In the polar regions, therefore, the aviator need bring his plane to a height of only four miles to reach the quiet air and easy flying condition of the stratosphere.

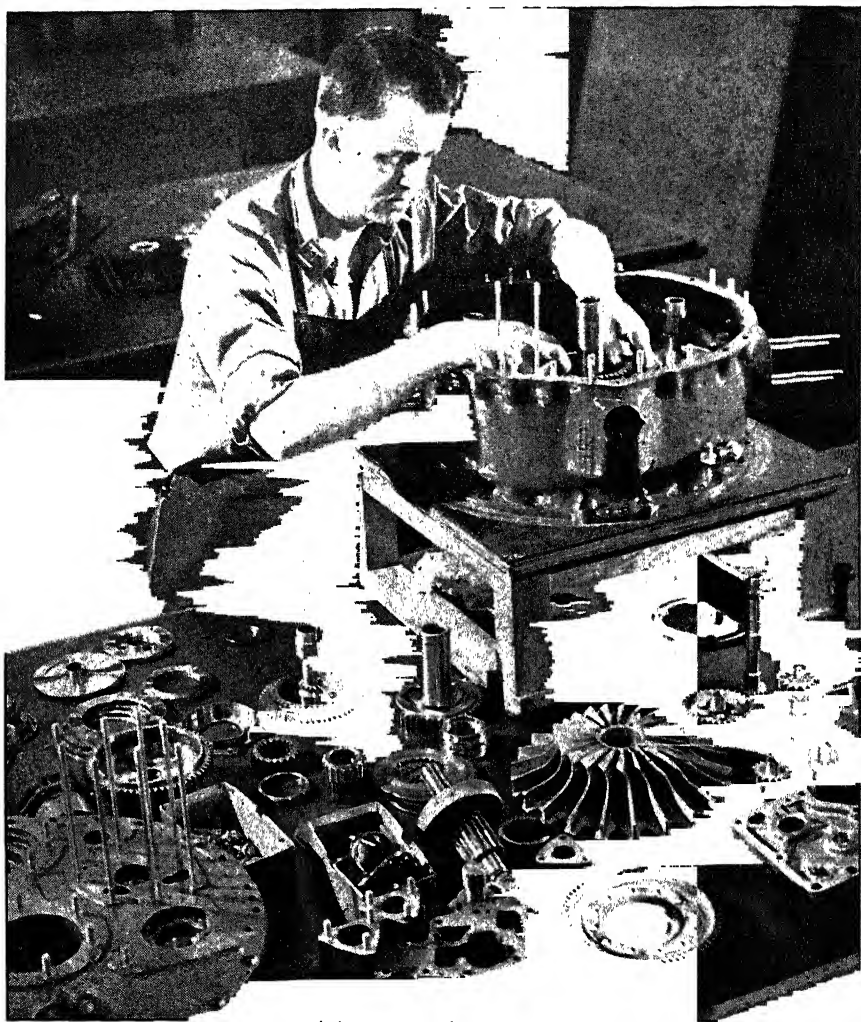
As the plane rises to higher levels, the passenger suffers in two ways: from lessening pressure, the effects of which have already been noted; he also suffers from the lack of oxygen in the thin air of



Courtesy of "Life"

Here is a graphic picture of the high-altitude problems of aviation. Pressure, shown by curving atmosphere-altitude line, drops from 30 inches of mercury at sea level to a faint 3.1 inches at 65,000 feet. Temperature falls to -67° F. at 40,000 feet and apparently remains at that level from there up. Clouds are absent in and above the stratosphere. Though men have soared in a balloon to 72,000 feet, limits of present combat planes and pilots put the stratospheric battleground in regions around 40,000 feet. (This legend refers to the latitude of the U. S. Naval Observatory at Arlington, Virginia.)

high altitudes. Both these effects may, to a considerable degree, be overcome. The aviator wears a mask connected with a tank of oxygen. The reduced pressure is overcome by providing the aviator with an airtight chamber in which pressure as nearly normal as is possible is maintained.



Courtesy Wright Aeronautical Corporation

All modern aircraft engines, such as the Wright Cyclones, which power the Boeing B-17 Flying Fortresses, are supercharged so that they can fly to great heights. At 10,000 feet an engine gets only $\frac{2}{3}$ as much air as at sea level. At 20,000 feet it gets only $\frac{1}{2}$ as much air as at sea level. At 30,000 feet it gets only $\frac{1}{3}$ as much air as at sea level. At 40,000 feet it gets only $\frac{1}{4}$ as much air as at sea level. Because aircraft engines get their power from burning a mixture of gasoline and air, they must have a great supply of air to keep on producing heavy power. The supercharger is nothing more than an air pump which compresses the thin air of high altitudes into a heavy and dense mixture for feeding to the engine. This picture shows all the multitude of parts that go into the supercharger section of a Cyclone engine.

GUIDES TO STUDY

1. How important is the atmosphere in our lives? Why an "ocean" of air?
2. What evidences have we that the atmosphere exists?
3. Of what is the atmosphere composed?
4. Which of the constituents of the air is most useful to us? Explain. Which helps most to retain the heat of the earth?
5. Aside from breathing why is the atmosphere absolutely necessary for life on the earth? Why does the amount of moisture in the air vary from place to place and from time to time?
6. What is meant by the pressure of the atmosphere? Why do we not feel it if the air is at rest?
7. How does the atmospheric pressure change as one ascends a mountain? As one descends into a mine? Why?
8. How is atmospheric pressure measured? Explain the barometer. How does temperature vary with altitude?
9. What part of the atmosphere is known as the troposphere? As the stratosphere? How do these two layers differ?
10. How does the aviator protect himself in the rarefied air of higher altitudes? Why is it necessary?
11. Why should the aviator know the characteristics of the troposphere and of the stratosphere?
12. Why should the airplane engine be provided with a supercharger when at high levels?

TOPICS FOR CLASS DISCUSSION

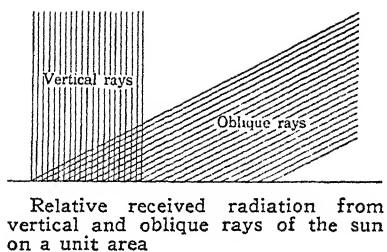
1. The height of the atmosphere.
2. Effects of rarefied air on the human body at high altitudes.
3. Uses of the barometer.
4. The importance of each of the constituents of the air.
5. Temperature of the air as affected by (1) change of season; (2) nearness to the sea.

WORK TO BE DONE

1. Special topics to be prepared by designated pupils: The use made of the atmosphere by plants and by animals living in water. Select additional topics.
2. Make a special study of the barometer. Make a diagram of a simple mercurial barometer in your notebook and explain it.

2. WIND AND WEATHER

Probably no other factor is so important as climate in determining where and how people must live. When we speak of the weather or of climate, we refer to the condition of the atmosphere in which we live. We are so dependent upon the air that we are highly sensitive to its varying conditions. There are many and important atmos-



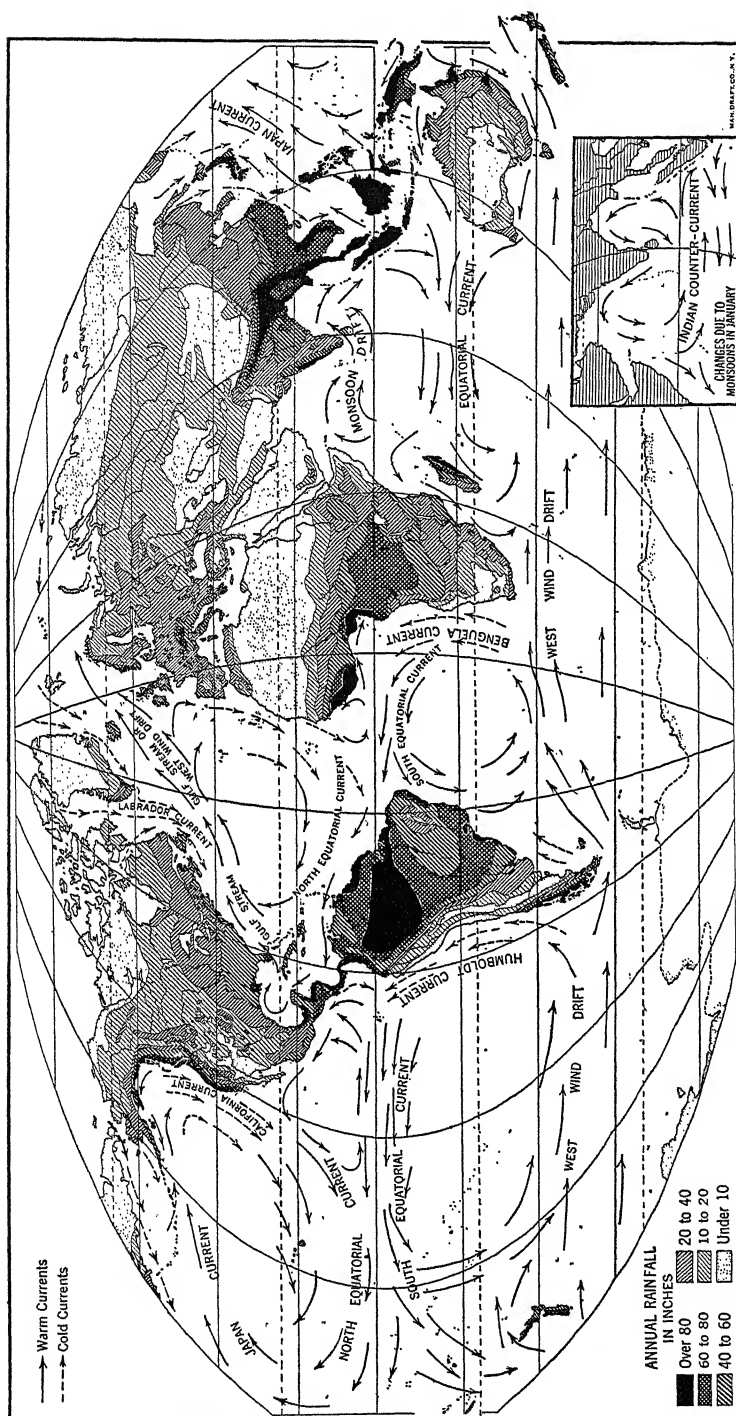
pheric changes day by day and season by season. The daily changes we speak of as *weather* while climate is the *average weather conditions* that prevail through long periods. In speaking of climate we generally refer to *temperature*, *moisture*, or *wind*, and these are regarded as the elements of climate. In a sense wind may be regarded as a modifier rather than an element of climate.

How the atmosphere is heated. We are all interested in the varying temperatures of the air. Winds are air in motion and are mainly due to unequal heating of the air. In the northern hemisphere north winds usually bring cold weather; south winds are usually warm; storms have as their chief cause differences in temperature of masses of air. Warm, dry air absorbs moisture; when this air is cooled sufficiently, the moisture is condensed and falls as rain, snow, or hail.

The atmosphere is heated either directly or indirectly by the sun. Rays of energy from the sun pass through the air heating it slightly. The greater part of the energy, however, passes directly to the earth where it is absorbed, thus heating the earth. The earth in turn heats the air above it. In general, the nearer the equator, the more nearly direct are the rays of the sun and the greater are their heating power per unit of area. The farther from the equator, the more oblique the rays and the less intense the heat. Whenever the sun is directly overhead, the rays are direct and give the greatest heat per unit of area.

Where the air is warm and where cool. Because of the difference in the slant of the sun's rays the air is warmer in equatorial regions than in polar regions. Furthermore, it is generally true that the higher the level, the cooler the air. The blanket of air, especially that made up of carbon dioxide, dust, and water vapor, becomes thinner as we ascend and therefore heat escapes more readily. Other reasons may be found for the low temperatures of high altitudes by means of research.

Over water in a given latitude the air in summer is cooler than the air over the land. So people flock to the seashore in hot summer weather. There they tan more quickly because they receive energy waves from the sun above and by reflection from the water below. In winter we find the conditions reversed. Then the water is warmer



This map shows average annual rainfall all over the world and the cold and warm currents that circulate in the ocean. These currents distribute temperature in much the same way that winds distribute temperatures over land areas.

than the land in the same latitude. The water retains the heat of summer longer. When the waters at the surface become cold, the warmer waters from below come to the surface and give up their heat to the air above.

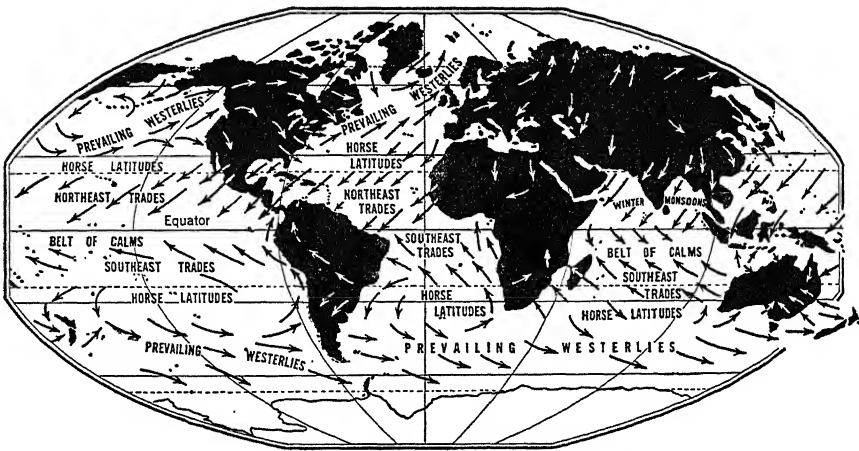
Whether the temperature of the air over the water affects that of the air over the land depends upon the direction of the wind. If winds generally blow from sea to land, lands bordering the sea will be cooler in summer and warmer in winter than will those regions where the winds blow from land to sea.

Such conditions as these play a very important part in the lives of men. Harbors far from the equator receiving winds from a sea having warm ocean currents remain ice-free in the coldest winters. Harbors on the coast of Norway around the North Cape to the Murmansk Coast almost never freeze. Lend-lease goods were sent from the United States and Britain to Russia by way of this coast no matter how cold the winter. The prevailing winds of the North Atlantic and Europe, and indeed all around the world at these latitudes, are from the west. Thus the warmer air of the ocean is carried over the land and as a result the harbors are kept free from ice. The warm waters of the Gulf Stream help to bring about this very desirable condition in northwest Europe (p. 35).

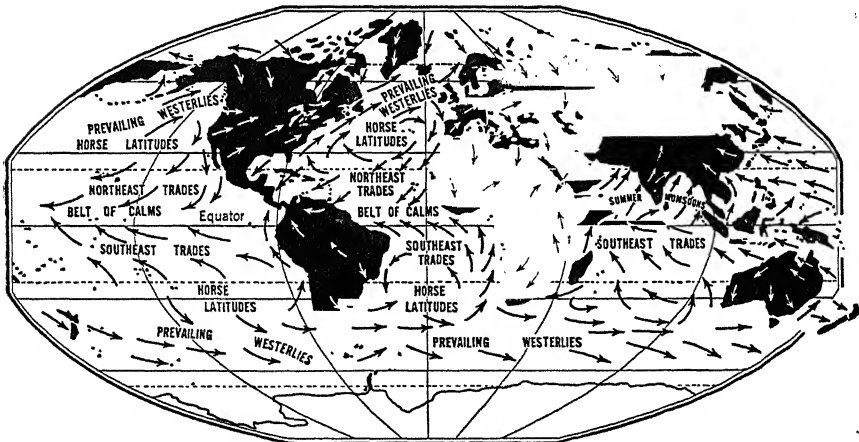
On the other hand, harbors on the east coast of Asia not so far north as the southern coast of Norway are closed by ice for weeks or even months every winter. The harbor of Vladivostok in eastern Russia receives the cold winter winds from the land of that great continent. As a result the harbor is kept open in winter only by the use of ice breakers.

Why the wind blows. A student was once asked in an examination to give the cause of winds. As he did not know, he quoted the Bible saying, "The wind bloweth where it listeth and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth." No doubt the student received a very low rating for that answer. Winds are really due to differences in temperature of masses of air. In a room the air about a radiator becomes warm, expands, and is therefore lighter than air in other parts of the room. Cold air being heavy sinks beneath the warm air and pushes it up, and in this way currents of air are set up.

The same conditions hold true out of doors. If in summer the air over the land becomes warmer than that over the sea, it becomes lighter and ascends, while the colder, heavier air over the sea forces its way over the land and helps displace the ascending warm air of



The location of the wind belts in January



The location of the wind belts in July

the land. This movement of the air near the ground we call a sea breeze. At night or in winter the breeze would probably be in the opposite direction. Winds blow from areas of high pressure to areas of low pressure.

Wind belts or planetary winds. By studying the diagrams of the wind belts of the world you will notice in the middle the equatorial belt of calms. There the air is very warm because of the greater amount of energy per unit area from the direct rays of the sun at those latitudes. This mass of warm air all around the earth

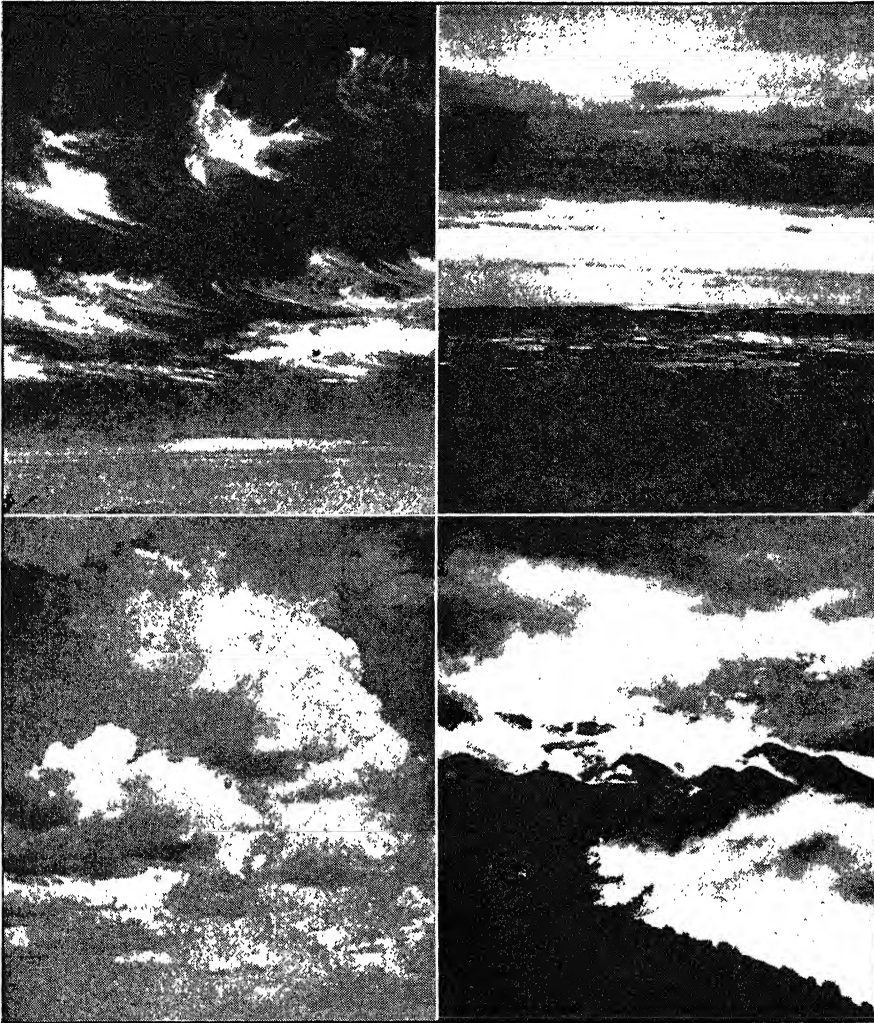
being lighter tends to rise and is pushed up to higher levels by the cooler air of the northeast trades and the southeast trades. Beyond the trade-wind belts in each hemisphere there is a narrow belt of descending air known as the horse latitude belts. Beyond these belts both north and south are the broad belts of westerly winds. All the wind belts are caused by the unequal heating of the earth and atmosphere at different latitudes. Beyond the westerlies are the caps of heavy polar air.

Moisture of the atmosphere. All air contains moisture even though we cannot always see it. When this moisture is invisible, it is in the form of water vapor that the air has taken up from the ocean or other moist surfaces by the process of evaporation. The warmer the air, the more moisture it can take up. When the air contains all the water vapor that it can hold, it is saturated. The temperature below which the moisture condenses is the *dew point*. If saturated air is cooled below the dew point, *condensation* occurs. If condensed particles are heavy enough to fall, *precipitation* (rain, snow, or hail) occurs.

Clouds. Visible moisture suspended in the atmosphere takes the form of fog or clouds. When the invisible moisture is condensed but remains suspended in the air near the earth, we know it as *fog*. Clouds consist of visible moisture suspended in the air at higher levels. There are various kinds of clouds. Very dark clouds, the source of the heavy rains of thunder showers and other storms, are known as *nimbus* clouds. They are usually at low altitudes. Rather flat clouds, best seen above a distant horizon, are called *stratus* clouds. *Cumulus* clouds are billowy masses of cloud with dome-shaped tops and flat bases. They are often observed on hot afternoons before a thunder shower. Thin fleecy clouds, high in the upper air, are called *cirrus* clouds. They consist of small ice particles and are frequently arranged in peculiar wavy designs.

Not all clouds are so well defined as clearly to come under one of these four heads. There are various combinations which are called according to their forms strato-cumulus, cumulo-nimbus, etc.

Condensation makes flying difficult. All forms of moisture resulting from condensation offer many problems to the aviator. The dewpoint is the temperature at which moisture condenses. If condensation takes place above the freezing point, fog or clouds are formed. These forms of moisture limit the aviator's visibility and his ceiling. Sometimes the pilot finds best flying conditions above the cloud level and sometimes below it. If condensation takes place



Courtesy U. S. Weather Bureau

Upper pictures show cirrus (left) and stratus (right) clouds; lower pictures show cumulus (left) and nimbus (right) clouds.

when the temperature is below freezing, the resulting precipitation takes the form of frost or snow. Sleet, which is frozen rain, collects on the wings, adds to the weight of the plane, and lessens its lifting power. The aviator must give close attention to the dewpoint and to the nearness of the dewpoint to the freezing temperature. The safety of his flight is closely related to the condensation of moisture and to all forms of precipitation resulting from it.

Distribution of rainfall. Rainfall is determined in the main by the following factors:

Latitude. Rainfall is generally greatest in equatorial regions and decreases toward the poles (p. 35).

Prevailing winds. Winds are generally moist if they blow from warm to cold regions and dry if they blow from cold to warm regions. They are usually moist if they blow from the ocean and dry if they blow from large land masses.

Proximity to the ocean. As a rule rainfall decreases with distance from the ocean though there are exceptions to this rule.

Mountains. Ranges of mountains deflect winds upward and precipitation results on the windward side of the mountains. Areas beyond, that is, on the leeward side, are usually dry.

GUIDES TO STUDY

1. What is the difference in the meaning of the terms *weather* and *climate*?
2. What conditions of the atmosphere are included in these terms?
3. What might be meant by the description of the weather as good by people having quite different interests? The farmer? The traveler in winter or in summer? The football team? The captain of a ship? An aviator?
4. How is the atmosphere heated?
5. What parts of the earth receive the most heat from the sun? Explain.
6. Why is the air cooler at higher levels?
7. Why are large bodies of water cooler in summer than the land in the same latitude? How do land temperatures differ from water temperatures in winter? Why?
8. Why are the harbors of Norway and western North America open all winter? Why are the Pacific harbors of Siberia in the same latitude as Norway often frozen?
9. Why does the wind blow? Which winds are warm? Which cold? Why?
10. Why does the air rise over the top of a hot radiator?
11. When an outer door is opened on a cold day, allowing the air to enter a warm room, what part of a person's body feels cold first? Why? Which is heavier, polar air or equatorial air? What follows from this difference?
12. Name the wind belts of the earth from the equator toward the poles. Learn the names and locations of these belts thoroughly.
13. What is meant by evaporation? Give illustrations. Define condensation. Give illustrations.
14. From what source does the atmosphere get the most of its moisture?
15. Describe all the movements of moisture from ocean to land, where it falls as rain, then back to the ocean again. Of what interest to the aviator is the dewpoint?
16. Name and describe the different kinds of clouds.
17. Why must the aviator give close attention to weather conditions?

18. What parts of the earth receive the most rain? (See p. 35.) Give the reason in each case as fully as you can.

TOPICS FOR CLASS DISCUSSION

1. Why people talk about the weather.
2. Different ways in which the atmosphere is heated.
3. The temperature of the air at different latitudes. At different heights.
4. How winds from the sea affect temperatures and rainfall. How winds from the land affect temperatures and rainfall.
5. The importance of rainfall as affecting water supply of cities and towns; as affecting crops, wells, springs, rivers, water power, etc.

WORK TO BE DONE

1. Draw a rectangle representing a room. Indicate a radiator in the center of the room. Draw arrows showing how the air moves above the radiator, on the floor of the room, along the walls of the room, and along the ceiling.
2. Perform experiments to illustrate evaporation and condensation. Why does a wet cloth dry best near a hot radiator or stove? Why does moisture appear when you breathe on a cold windowpane? Apply these experiments and others to weather conditions.

THE CLIMATES OF THE WIND BELTS

The equatorial calm belt. This is a rainy belt. There warm, moist air is forced to higher levels where it is cooled and its moisture condensed. The heat and moisture of this belt cause vegetation to grow luxuriantly. In this belt lie the dense forests of the Amazon Valley and the swampy jungles of Guadalcanal. On these regions we depend for tropical woods such as mahogany and ebony; there also are the wild rubber trees of the Amazon Valley and the rubber plantations of the East Indies, West Africa, and Brazil. This belt produces many other commodities which we have come to look upon as necessities. Some of them are Manila hemp, cocoa, and palm oil.

Climates of the trade-wind belts. North and south of the equatorial calm belt are the trade-wind belts. Some parts of these belts are very rainy; others are very dry. Where the trades blow over great stretches of low level land, there is little or no rain and the region is arid as is the case in the Sahara. These winds as they blow toward the equator are continually getting warmer and therefore drier. In other parts the trade winds blow over the oceans taking up the moisture as they pass over the surface. When they reach high land, the air is forced up and cooled, the moisture is condensed

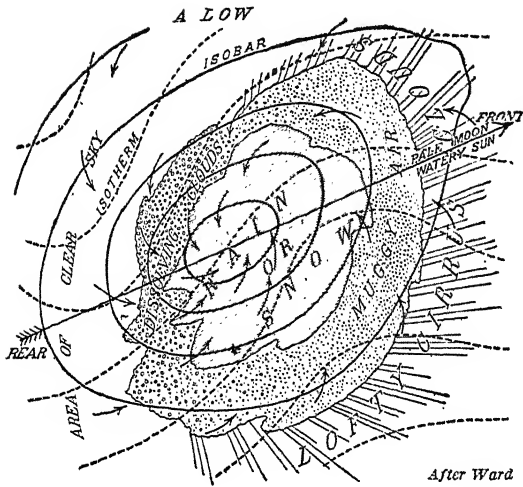
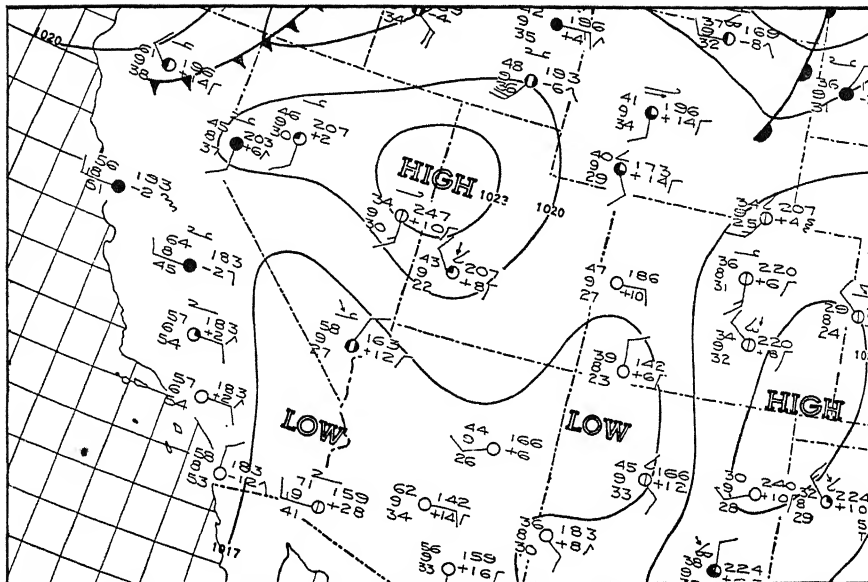


Diagram of a cyclonic storm, or Low, in horizontal plane, in the northern hemisphere. The whole storm may be 500 to 1,000 miles in diameter. The long arrow shows the direction in which the storm as a whole is moving. The short arrows show the movement of the winds in the storm. They would blow directly into the center of the storm but the deflection to the right due to the earth's rotation gives them a curved path. Thus a *counter-clockwise spiral rotation* is developed. The solid black lines are isobars, or lines of equal air pressure; the one at the center shows the lowest pressure. The dotted lines are isotherms or lines of equal temperature; the temperature decreases from the lower right hand to the upper left hand portion of the figure.

and precipitation follows usually, in these latitudes, in the form of rain. The northeast trades bring rain to the islands of the West Indies and to the eastern shores of Central America. The southeast trades bring rain to the eastern shores of Brazil, to eastern South Africa, and to southeastern Australia. (See p. 35.)

The horse latitudes and the westerlies. Beyond the trades are the horse latitude belts where the air descends from higher levels and is thereby warmed. This is a dry belt. North of the horse latitude belt in the northern hemisphere and to the south of it in the southern hemisphere lie the prevailing westerlies. In these belts there are rainy regions and dry areas, both with varying degrees of temperature. In these westerly belts great whirling masses of air known as *cyclonic storms* move in the westerly winds from west to east.

The pressure of the air in a cyclone becomes less and less from the circumference toward the center, where the pressure is lowest of all. Because the cyclone is an area of low pressure, it is referred to as a *low* (p. 43). In and near the center the air moves to higher levels where it expands and cools and its moisture is condensed, thus causing precipitation. An area of low pressure known as a *low* is followed by a *high*, an area in which cool, heavy air moves from higher levels to the earth's surface. As the air descends, it is compressed and warmed and thus is able to hold more moisture. An area of high pressure usually brings fair weather as contrasted with a low, which usually brings stormy weather. Since highs and lows are located in the westerly winds, they are carried from west to east by the belt of winds of which they are a part. This regularity of movement



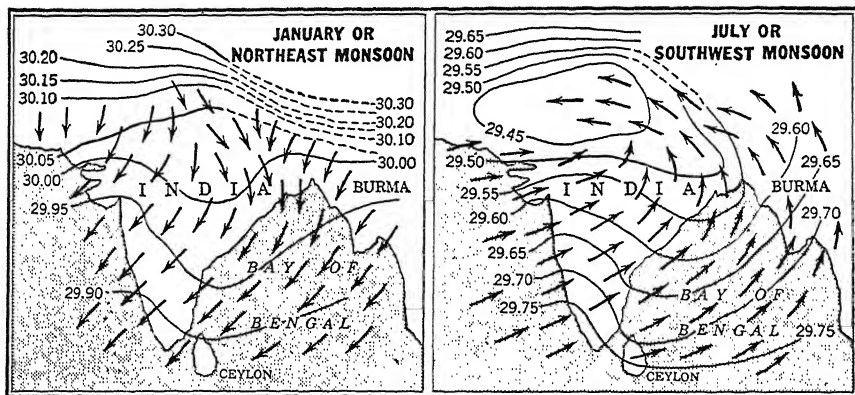
A section of a Government weather map. The average speed of lows ranges from 477 to 718 miles a day; of highs from 485 to 594 miles a day. The isobars (black lines) pass through points of equal barometric pressure measured in inches.

helps the forecaster because he will expect weather conditions to move generally from west to east.

These lows, or cyclones, and highs, or anticyclones, are the causes of the changes in the weather of the westerly belt from day to day. (See p. 42.) Sometimes the changes are abrupt and the difference in temperature very great. Mark Twain said of New England weather, "If you don't like New England weather, wait a minute."

When the cyclones move over eastern North America, winds drawn into the center of the whirl bring moisture-laden winds from the Atlantic and the Gulf of Mexico. As the whirl passes, the winds in the western half of the whirl are from the land and, therefore, dry and usually bring fair weather.

The wind belts migrate. As the earth revolves around the sun and the seasons change from summer to winter and back again, all the wind belts move toward the north in summer and toward the south in winter. One result of this is seen in the Sudan of central Africa. When the equatorial calm belt moves north over the Sudan, that region has its rainy season. When the belts move south, the northeast trades reach the Sudan and the region is very dry. Similar conditions prevail wherever the equatorial calm belt and the trades swing north and south with the seasons.



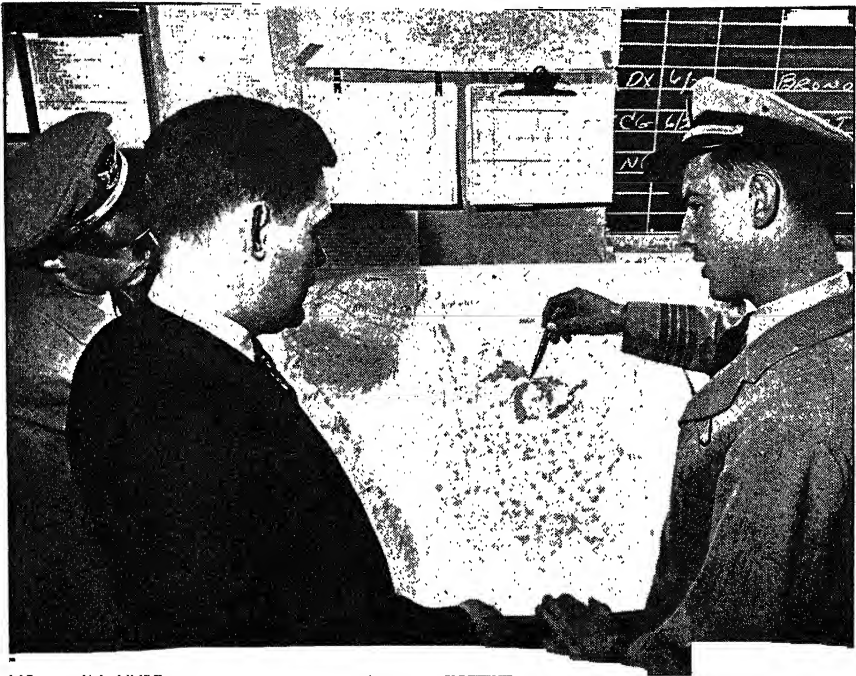
Winter and summer monsoons of southern Asia

Monsoons. The monsoons of India offer one of the best illustrations of the effects of migration of the heat and wind belts. In winter the winds of India are the northeast trades and, since they blow from the land, are on the whole dry winds. In summer, as the belts move northward, winds from the seas to the south blow over India bringing a great abundance of rain. When the British and Japanese were fighting in Burma and Malaya, plans for attack or defense always took into account the time of the heavy rains. Rain is needed most in summer when crops are growing. India's plentiful summer rains help that country to support a very dense population.

Mediterranean climate. Another result of migrating wind belts is seen in the countries bordering the Mediterranean Sea. In summer the northeast trades are over those countries and there is very little rain. In winter the trades move southward and are replaced by the westerly winds with their rain-bearing cyclonic storms. This kind of climate is known as the Mediterranean type. General Eisenhower's campaign was greatly hampered by the winter rains of Algeria and Tunisia. The land became so muddy that it was almost impossible to use tanks and other heavy equipment.

The Mediterranean type of climate also occurs in our own Southwest, particularly in Southern California. The lack of summer rains makes it necessary to irrigate all the farm lands. The dry summers, however, make it possible to dry grapes, apricots, and prunes in enormous quantities in the open air.

The weather forecast. In our large centers weather forecasts are announced by means of a recording device located at the Weather Bureau. A person wishing to know the forecast telephones the bu-



Courtesy United Air Lines

The pilots and the dispatcher lay out a scientific and precise plan for the airplane's operation. Of course weather maps figure prominently in their decisions.

reau and a voice automatically gives the forecast. If the receiver is not replaced at the end of the forecast, the listener hears the forecast repeated again and again. This method of making the forecast known is of value chiefly to the general public. The information given is very limited. In times of peace detailed weather forecasts are published in the newspapers, broadcast by radio, and along the shores are made known by a display of flags.

Everyone is interested in the weather forecasts. Farmers, shippers of perishable fruits and vegetables, captains of ships, and airplane pilots all rely on them. In parts of a country where a single crop is grown, such as a wheat-growing section of the United States or Canada, everyone is intensely interested in the weather. If the wheat crop fails, there is loss of business for the grocer, the druggist, the shoestore, and the motion-picture theater. Every businessman, no matter what his business, scans the sky to look for the kind of weather that is good for wheat. Even if one's business does not depend upon the weather, one must dress to keep warm or keep cool or keep dry; if he drives a car, he needs to know of possible rain, snow, or sleet.

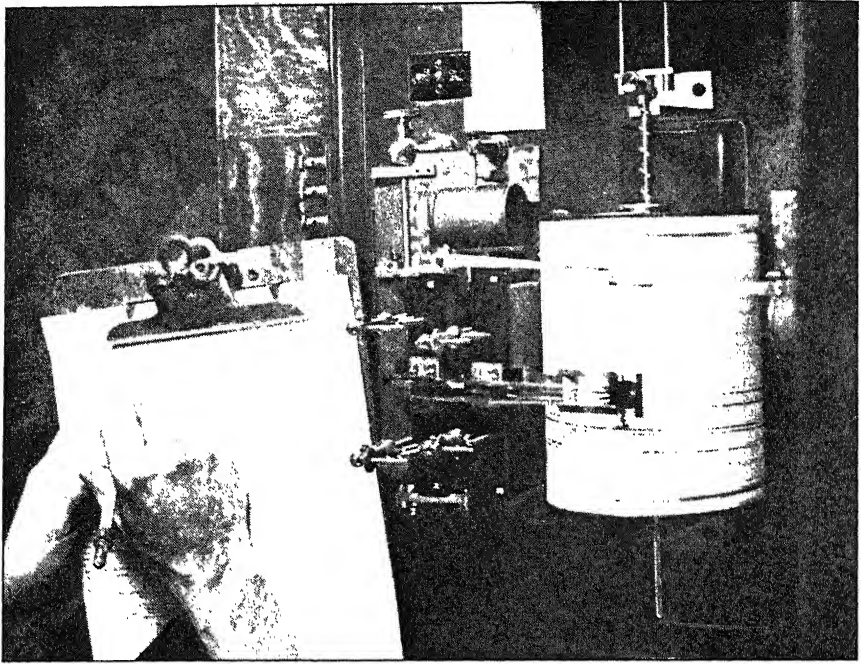


Photo by l'ictor de Palma from Black Star

Various intricate machines and apparatus are found in and outside of the Weather Bureau offices. They are all used in checking weather conditions.

The airplane pilot perhaps most of all should know what risk the weather will bring. Will it be fog, strong winds, or sleet to coat the wings of his plane with ice? What is the visibility, that is, how far away can he see clearly? What is the height of the ceiling, that is, how far from the ground are the lowest clouds? The plane pilot does not lose sight of the fact that it is the ocean of air through which his ship moves. It is just as much his business to know his ocean of air as for the master of a steamship to know his ocean of water. The pilot of the plane must know all conditions of winds, temperature, moisture, and visibility before he starts, as he proceeds, and before he grounds his plane. His own safety and the safety of his crew and his passengers depend upon his knowledge.

How forecasting is done. Scattered throughout the country mainly along the civil airways are 800 weather stations. The work of a station is to collect weather data of all kinds, including strength and direction of the wind, the kind and quantity of precipitation, the temperature and pressure of the air, the proportion of sky covered with clouds, the height of the clouds, and the changes taking place in the pressure and temperature and wind velocity. Each station re-

ceives data from all other stations, from foreign countries, and from ships at sea.

From the data obtained a station prepares weather maps, diagrams, and charts illustrating the weather changes going on throughout the country. Study of the maps and charts enables the forecaster to predict with some degree of certainty the weather to be expected in the vicinity of any station within a day or so.

In time of war weather forecasts are not published in newspapers or broadcast by radio if the information is likely to be of value to the enemy. In the westerly wind belt the weather conditions at any one section may be expected to move eastward. For this reason a broadcaster describing a ball game or other event in time of war is not permitted to state the weather of the locality at that time.

Climate and human prosperity. In many parts of the tropics there are large areas of great fertility. In such areas living conditions are often so easy that people have to work but little for their food, clothing, and shelter, as compared with the vigorous efforts necessary in the colder regions. We find that the greatest progress in civilization has been made in the cool, temperate regions of the world. Hot, moist climates are not invigorating and people do not feel like working hard; whereas in colder climates the worker has much greater energy.

In hot, moist regions climatic conditions are favorable for the development of disease-producing germs. Most progressive undertakings in the tropics, such as the cultivation of sugar cane, tropical fruits, and rubber, are under the management of Americans and Europeans who may spend but a part of their time in the tropics. In the colder regions people must work for their support or suffer for the necessities of life. They must contend with constantly changing conditions which arise with the passing of storms, cold waves, and the seasons—all of which tend to stimulate energy and thrift. The preparation for cold winters and short growing seasons call for forethought and hard work. This creates habits of industry and thrift and stimulates inventions. People often think hard work is a misfortune when in reality it is a blessing if not too severe. Of course conditions may be so adverse that no amount of struggle can result in progress.

Climate and world trade. The relative climates of two countries often decide their trade relations. Cool, temperate regions are likely to be industrial. Moist, tropical areas will probably produce rubber, vegetable oils, and fibers needed by the industries. The tropical

country, on the other hand, will require the manufactured goods of the cool regions. Such regions or countries supplement each other, that is, each meets the other's needs. For instance, before the war the East Indies and the Philippines provided an abundance of rubber and Manila hemp needed by the manufacturing countries of Europe and the United States. The industrial regions, in turn, found a market for some of their products in the tropics of the Far East.

On the other hand, countries having similar climates may prove to be competitors. Temperate Argentina and temperate Canada will try to sell their wheat in the same world markets. Plantation rubber of the tropical East Indies almost drove the wild rubber of the Amazon Valley out of world trade. Industrial countries of the cyclonic belt are also competitors, for the reason that temperate lands are inhabited by progressive peoples and because of their stimulating climate are better adapted to manufacturing than tropical lands.

GUIDES TO STUDY

1. Why is the equatorial calm belt a rainy belt? Find on your map the countries which lie in this belt and name as many of the products of the belt as you can.

2. Locate the trade-wind belts on the map. Why are some trade-wind regions dry while others are rainy?

3. Practically all of the United States is in the prevailing westerly belt. What would you say are the characteristics of the climate of the place where you live?

4. Study the diagram of a cyclone (p. 42). Note the direction of the wind, the barometric pressure, and any other characteristics which the diagram shows. If a cyclone is in the eastern part of the United States, which winds will bring rain? Which winds will bring fair weather? Which winds will be warm winds? Which cold?

5. How will the weather change for the place over which the cyclone moves from west to east?

6. Why do anticyclones usually bring fair weather?

7. How do the positions of the wind belts change from season to season? Why?

8. Why does the migration of the belts affect the climate of the Sudan in Africa? Can you find other places where changes take place because of the migration of the belts?

9. See the diagrams (p. 44) and explain the monsoons of India.

10. Why are Mediterranean countries rainy in winter and dry in summer?

11. Why is it necessary to irrigate the crops of Southern California?

12. What is meant by weather forecasting? Who is benefited by it?

13. Why do we frequently look for the weather forecast in our daily papers? Why do we find very little in our papers about the weather just now?

14. What facts about the weather are of especial interest to the aviator?

15. Describe the way in which the Weather Bureau forecasts the weather. What does the forecast tell? Why are all these facts necessary?
16. In what parts of the world do we find the most progressive nations? Why?
17. By whom are the resources of regions occupied by primitive or backward peoples very largely developed?
18. The people of temperate regions depend upon the tropics for what products?
19. Since the climate of hot, moist regions is not healthful for the people from temperate lands, what means are used to develop the resources of tropical countries? How, for instance, are rubber plantations managed?
20. Show that much of the foreign trade of the world is due to differences in climate.

TOPICS FOR CLASS DISCUSSION

1. Relation of climate to human progress.
2. Chief products and industries of the different climatic belts.
3. The degrees of civilization in the different belts.
4. Comparison of the climate and products of Mediterranean countries with those of Southern California.
5. The dependence of one climatic belt upon another.
6. The cyclonic type of climate. Its importance to our Middle West.
7. The influence of mountains on rainfall.

WORK TO BE DONE

1. Draw a diagram of a cyclonic area indicating parts where the pressure is high and where it is low, the directions of the wind, where it is stormy and where it is fair, and where the winds are warm and where cold. Indicate the direction in which the storm is moving. Predict the weather the region to the east of the storm will have as the storm passes over.
2. Make a study of weather forecasting. Read forecasts in the newspapers and note later to what extent they were correct. Make a list of people and occupations benefited by forecasting.
3. Make a study of the migration of the wind belts. Learn the effects of migration of the belts upon each of the following regions: India, the Mediterranean region, southern California, central Chile, the Sudan of Africa. What has the migration of the belts to do with the overflow of the Nile River? (See p. 43.)

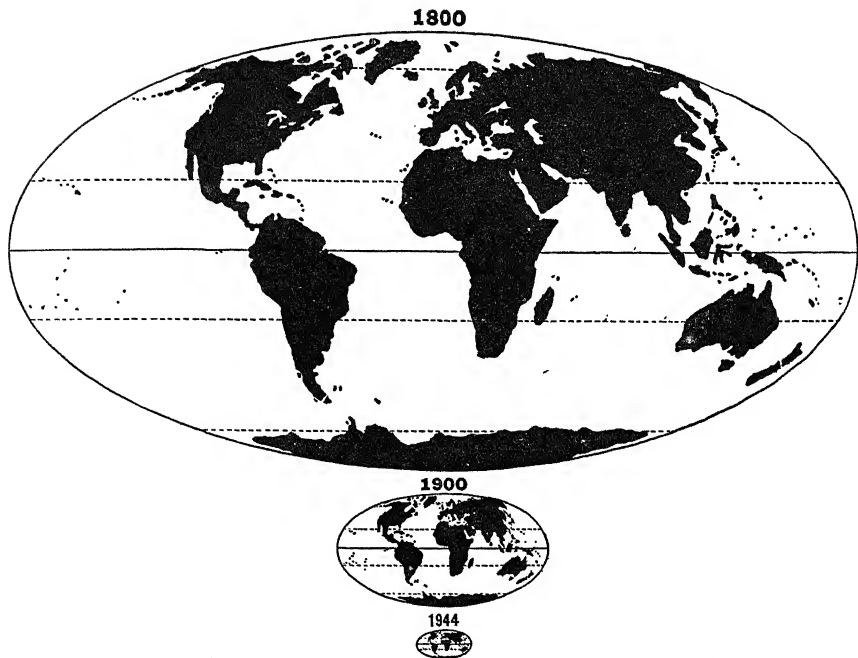
UNIT IV. THE SURFACE OF THE EARTH

LANDS AND WATERS

Continents and oceans. The earth's surface may be thought of as covered with ridges and depressions—some large and some small. The large ridges are the continents and in the deep depressions lie the waters of the oceans. Smaller ridges appear as mountain ranges and small depressions as valleys. Some mountain ranges seem to serve as the bony framework of the continents as do the western and eastern highlands of both North and South America.

Continents occupy only one fourth of the surface of the earth, and, if the solid part of the earth's surface were leveled off, the whole face of the earth would be covered with a deep layer of water. In the north polar region North America, Europe, and Asia become next-door neighbors around the polar seas. North America and South America are separated from all the other continents by the broad Atlantic and still broader Pacific, but these great oceans which once seemed to be barriers now prove to be highways which tie the continents together more closely than land routes. It was only a few centuries ago that the western hemisphere was discovered by the eastern world. Until the construction of the Suez Canal the larger continents of the eastern hemisphere were all united. The nearness of the eastern continents to one another, however, did not mean unity of human relationships. Apart from its northern fringes Africa remained the "Dark Continent" to Europeans and was almost as little known as the Americas. Life in one of the eastern continents was quite different from that in another, and what life was like in one continent was unknown in another. Indeed, land barriers of the Old World proved to be more forbidding than ocean barriers. Man had to wait for the railroad, the steamship, and, most of all, for the airplane to bring parts of the world close together.

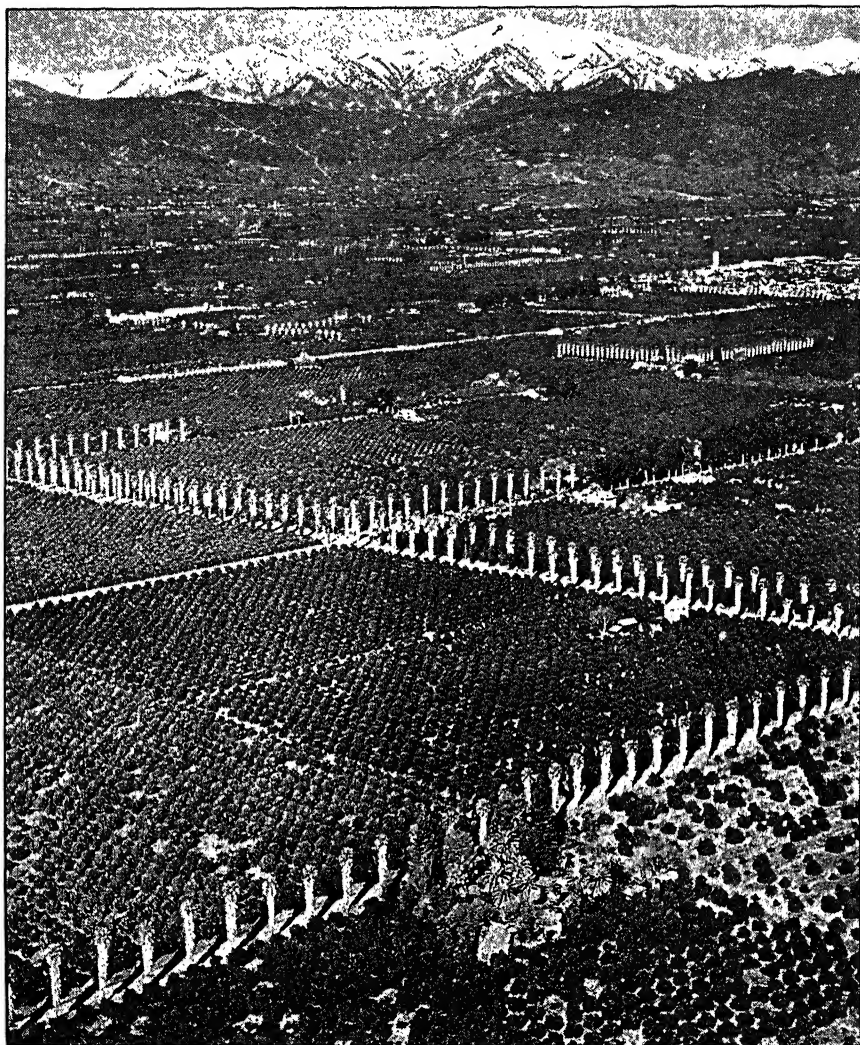
The oceans. Although man's home is on the land, his life has been strongly influenced by the seas. Those who lived along the shores obtained from the sea a large part of their food. Here also man learned to build ships which in time led to exploration, to settlement in distant lands, to colonization, to the building of navies and merchant ships, to foreign trade, and to control of the seas. Even before the days of Columbus the broad oceans offered a constant challenge which has through the centuries spurred man on to adventure and accomplishment.



As speed of travel increases, the size of the world decreases.

The oceans make life on the continents possible. Air over the sea takes up moisture which is carried by winds over the land where it falls as rain thus furnishing the water needed for agriculture. Winds from the sea also tend to temper the heat of summer and the cold of winter. The highest temperatures of summer and the lowest temperatures of winter are never along the coasts. Ocean currents also help to temper the climate. These currents are large streams which flow over the surface of the oceans (p. 35). They are caused mainly by the winds. The currents flowing from the equatorial regions are warm while those from polar regions are cold. If winds blow from ocean currents toward the land, the currents may have a marked influence on the temperature and rainfall of the land over which the winds blow.

The surface of the continents. The features of the land are mainly mountains, plateaus, and plains. Mountains are high elevations of the land with steep slopes and often occur in chains which extend for hundreds or thousands of miles as do the Rocky Mountains and the Andes in North and South America. Plateaus are extensive areas of level highlands often several thousand feet above the sea. Large plateaus are usually cold and dry, inhabited chiefly by

*Sunkist Photo*

Air view of a California valley of citrus orchards. The groves include orange, lemon, and grapefruit trees. Melting snow on the distant mountains helps to supply irrigation water. Mt. Baldy is seen in the background.

nomads who wander from place to place seeking grass for their herds of cattle, sheep, or goats. Plains are level areas of rather low land which make up a large part of the surface of all the continents.

Mountains and life. Since mountains rise to considerable height, the climate at the tops is colder than on plains in the same latitude. Even near the equator the tops of high mountains are covered with snow and ice throughout the year. Such heights cannot, of course, support human beings or even the lower animals. Mountains

are nearly always the sources of many streams because the air as it passes over them is cooled and its moisture falls as rain or snow. If the snows of winter melt, the following summer streams from the mountainsides may supply irrigation water for the farms and orchards of the plains below. It is in this way that the many truck farms and fruit orchards of Southern California get their water supply. The winds give up most of their moisture on the side of the mountains from which the wind blows. On the other side of the mountains, the leeward side, the land is either semiarid or desertlike (p. 35). The slight rainfall of the Great Plains east of the Rockies is due in part to the fact that the westerly winds have lost most of their moisture on the western side of the mountains. The great desert known as the "dead heart of Australia" receives little or no rain because the southeast trades have given up their moisture on the eastern side of the mountains of eastern Australia.

Mountains have rugged surfaces and little good soil. For this reason farming is carried on with great difficulty. On mountainsides where grass grows, sheep and goats may be pastured, and, if the land is not too steep, even cattle may graze in summer. In some countries as in Switzerland and Norway the animals are driven up to the mountain pastures for the summer and in the fall are driven back to the warmer valleys for the winter. Mountains make travel and transportation difficult. Few roads or railroads cross high mountains. Products are carried from western Brazil down the Amazon and northwest through the Panama Canal, thousands of miles to the western side of the Andes only a few hundred miles from their starting place. The high Andes of northern South America are so rugged that passage over the mountains is next to impossible. The little traffic that is carried on is done with the sure-footed llama, the pack animal of the Andes. In the United States and Canada the Rocky Mountains are crossed by road and railroad through passes worn by rivers through ages of time. Even the airplane in crossing high mountains seeks the gaps or passes so that it will not be obliged to lift its heavy load to greater heights. Mountains attract tourists who come to see the beautiful mountain scenery and to engage in sports. High mountain walls serve as barriers to keep out enemies. The Alps have served to protect Italy and the Himalayas, India. Inhabitants of mountainous regions are often said to be more hardy, vigorous, and freedom-loving than people who live upon plains. It has been pointed out, however, that plains people will fight just as valiantly to protect their homes and families as will the mountaineers.

Plains. A large part of the surface of the continents consists of plains. They are low, level or gently rolling lands, due in some instances to the uplift of the level floor of the sea, in others to the overflow of rivers or the outwash of sediments from adjacent highlands. In nearly every continent the great majority of the people live on the low plains. There, because of the level surface and the finer soil, farming can be carried on. Manufacturing too is favored for the reason that transportation is easier on level areas than in rugged regions. Roads and railroads are more easily built over which foods, raw materials, and manufactured goods can be transported.

The Central Plains of the United States is one of the richest producing areas of the world. The central plain of Europe excels in agriculture, manufacturing, and trade. France, Germany, Russia, and several other countries of Europe owed their wealth and prosperity to the advantage offered by the great central plain of the continent.

Some equatorial regions, like the Amazon Valley, where the climate is hot, moist, and unhealthful have few inhabitants. In the tropical regions of South America by far the larger proportion of the population lives in the highlands.

Rivers. Countries having a moderate or heavy rainfall have rivers which carry the surplus waters to the sea. Where slopes are steep, rivers usually have falls and rapids which furnish power for mills and factories and for the generation of electricity which may be transmitted by wire for several hundred miles. In colonial days nearly every settlement was made beside a waterfall so that the power could be used to grind the grain and saw the logs for building purposes. In many cases the power of the water of the small streams is no longer used but the village is still located in the little valley beside the falls.

The large falls still provide power for the mills, factories, and hydroelectric plants of today. Minneapolis grinds wheat with the power of the Mississippi; Niagara Falls provides power for a variety of industries. Rivers with gentle slopes are likely to be navigable as are the Amazon, the Mississippi, and the Nile. Such rivers often overflow their banks at the time of heavy rains or melting snows. If the overflow is gentle like that of the Nile, a fine layer of rich soil is spread over the flood plain. This supply of rich soil serves as a fertilizer and is of great value to the farmer. River valleys, such as those of the Nile, Euphrates, and Ganges, with well-developed flood plains have served as cradles of civilization. The Mississippi floods

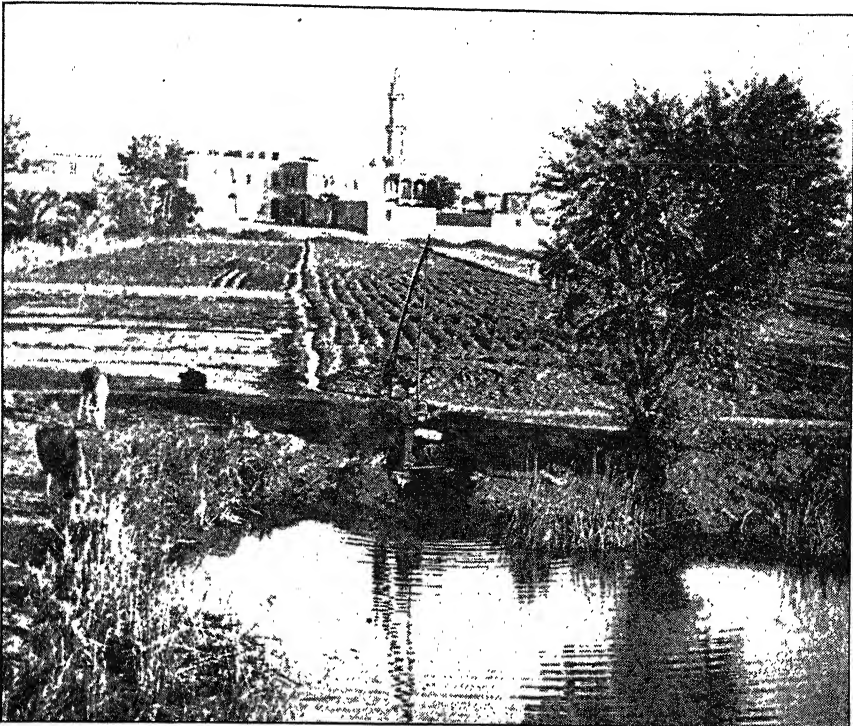


Photo by Mrs. Branson De Cou from Black Star

Irrigating a field in the fertile Nile Delta, near Cairo, Egypt

are often destructive. Farm buildings are swept away, farm crops and equipment are ruined, and many lives are lost.

Underground water. Not all the water which falls as rain is carried off by rivers. About one third of it sinks into the ground where it plays a very important part in man's life. Some of it gradually finds its way to streams and rivers, thus giving them a steady or uniform flow in time of drought. Ground water supplies springs and wells and helps to fill lakes thus giving water for all the uses we make of it. Plants must have water supplied to their roots constantly to dissolve the mineral matter needed for their growth and to furnish the water necessary for their circulatory system.

In very wet seasons when the supply of water is abundant, ground water may rise to the very surface of the earth. During dry periods the level of the ground water sinks lower and lower and the supply to springs, wells, and the roots of plants becomes less and less. At such times wells go dry, plants wither, and crops may be a failure.

The soil. Soil is another necessity for all plants and animals. All



This map shows the parts of North America which were covered by the great ice sheet. All this part of the continent has what is known as glacial soil—soil that was carried from one region to another. Much of the soil is rocky. Glaciated regions are also characterized by the presence of many lakes, swamps, waterfalls, and rapids.

a great sheet of ice is known as *glacial soil*. The rich soil of the farm lands of our great Central Plains, much of which is of glacial origin, furnishes food for the people of our country as well as much of that now being sent to our allies in Europe and Asia.

over the earth solid rock is decaying to form the fine sediment which with the decayed vegetable matter added by years of plant growth we call *soil*. Soil holds the water necessary for the solution of the minerals in it. It is only when the minerals are dissolved that they can be taken up by the roots of the plants. Plants send their roots into the soil and from it obtain the minerals needed for their growth. The sediment spread over the flood plain of a river we call *alluvial soil*. Wind-blown soil is sometimes known as *loess*. The soil of northern North America which was spread over the land by

GUIDES TO STUDY

1. Can you show that mountains form the framework of North and South America?
2. In centuries past what forms of land and water separated the people of the world and even the people of a continent?
3. What effect did such separations have upon languages and customs?
4. How have the barriers due to physical features been overcome?
5. Formerly oceans were barriers dreaded by all sailors. Why have they come to be very important highways?
6. Why do countries like Norway and Chile depend more upon the ocean for communication between one part and another than upon land routes?
7. How have the oceans influenced man's life?
8. What is the relation of the oceans to rainfall?
9. What are ocean currents? How do they affect the climate of the land?

10. What are the outstanding features of the surface of the land?
11. Describe the different land features. Which of these features have you seen? Describe those you have seen.
12. How do mountains influence life?
13. How do mountains help irrigation?
14. How do mountains sometimes cause deserts?
15. Why are mountains better adapted to grazing than to farming?
16. How do mountains affect transportation? Give illustrations.
17. Where do roads, railroads, and even airplanes cross mountains? Why?
18. Why are tourists attracted by mountains?
19. What do we mean by the term *plain*?
20. Why do more people live on plains than on mountains?
21. Why do we usually find the leading agricultural and industrial peoples on the great plains of the world? Give illustrations.
22. Some plains have a sparse population. Why?
23. In what kind of region do we find sluggish rivers?
24. How do swiftly flowing rivers affect life? Why do towns and cities grow up beside such rivers? Give illustration.
25. What use does man make of rivers with slow currents? Which of the two kinds of rivers will be used for transportation? Why?
26. What do we mean by *underground* water? Of what use is it? What is its relation to rainfall?
27. What is soil? How do our lives depend upon it?
28. Show that practically all our food and clothing come either directly or indirectly from the soil.

TOPICS FOR CLASS DISCUSSION

1. Oceans bring continents closer together.
2. Ocean currents and climate.
3. How mountains affect life.
4. The great rivers of our country and their uses.
5. Soil—how it is made and its uses.
6. The different kinds of soil and the value of each.
7. The soil of your locality.
8. The necessity of water to plant life.
9. The more important minerals which plants require from the soil.

WORK TO BE DONE

1. Study a globe or physical map of the world and note the parts which are mostly land and the parts mostly water. Fix in mind the names and location of large islands as well as the continents. Find out to what country each of the large islands belongs.
2. Study the map (p. 106) showing the leading ocean routes of the world. Why are some routes more important than others?
3. Study physical maps and become familiar with the great mountain ranges and the great plains of the world. Find some way in which each of these influences the lives of the people in that part of the world.

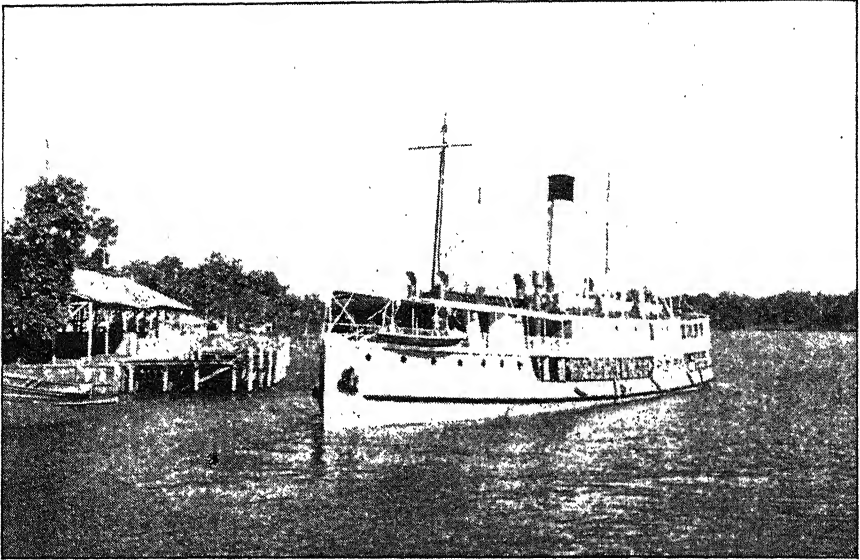


Photo by James Sawyers

This steamer plies the Amazon between the Atlantic and the river port of Iquitos, Peru, two thousand miles up the river. Before the days of plantation rubber Iquitos was an important port for the export of wild rubber. With plantation rubber cut off by the Japanese, there is again a great demand for the wild rubber of the Amazon Valley.

4. Find on the maps of the continents the great rivers of the world. Note where their sources are, through what countries they flow, and into what seas or oceans they flow. Learn something of the value of each to the lands through which it flows. Note the location of cities in relation to the rivers and try to account for that relationship.

5. Learn what has been done to "tame" the Mississippi River.

6. Make a study of underground water as related to wells, springs, rivers, and crops.

UNIT V. WORLD-WIDE OCCUPATIONS



Photo by James Sawders

Picking short-stapled upland cotton on a plantation near Camden, South Carolina.
Note the bags hanging from the shoulders of the workers.

Work is man's greatest blessing. After Adam's disobedience in the Garden of Eden God said to him, "In the sweat of thy face shalt thou eat bread." This no doubt has been thought of as punishment meted out to Adam and Eve for their wrongdoing. Work, however, hard work, of many kinds has proved to be man's greatest blessing. As "necessity is the mother of invention" so need, often great need, has spurred man on to accomplishment and progress. Indeed, men and women are not content to be idle and unprogressive. Even when not compelled to do so, men have endured great hardships to explore strange seas and new lands and in new lands to clear the forests, break the sod, and in so doing lay the foundations for a new civilization, a new way of life.

The earth offers unlimited opportunity for man's efforts. There are forests to be cleared, land to be tilled, ores to be mined, raw materials to be made into finished goods, and commodities of all kinds to be carried from place to place. These occupations are carried on even in a community where life is very simple, such as in a new settlement made by pioneers.

Life becomes complex. As inventions were created and machines constructed, work became specialized and the number of occupations increased. In time the people of one region found they could do one kind of work better than others. This may have been due to the possession of certain resources, such as coal or iron, or

perhaps the climate of the region permitted it to grow certain crops which could not be grown in another type of climate. As a result, each region came to do the kind of work it could do best, turned out the commodity best adapted to that region, and looked to other producing regions for those commodities it could not produce so well. Thus we find today one part of a country engaged chiefly in raising wheat, another in raising cotton, and still another in producing lumber. In the more thickly settled districts of the land where large cities are located we find great mills and factories or ports where goods move to and from all corners of the earth. We shall now study for a time a few of the occupations which underlie our daily economic life and note how the work of one part of the world is related to that of other parts.

I. AGRICULTURE—EVERYWHERE

Man becomes a farmer. From the soil we obtain nearly all our food, clothing, and shelter. Early man no doubt was a hunter, but in time he learned to domesticate animals and so grazing or herding became his chief work. As he learned to cultivate plants and till the soil, he no longer roamed about as a hunter or a herder but settled down in one locality as a farmer.

All early civilizations developed along with agriculture. As men lived together in the rich flood plain of the Nile, the Tigris, and the Euphrates, and on other plains protected by deserts and mountains, they found it necessary to make rules or laws governing their dealings with one another. Farming also required that they look ahead from season to season. The seed of one harvest had to be saved for the next year's planting. Any excess of one year could be preserved for a possible scarcity the next year. Irrigation made necessary the relocation of the boundaries of fields. In this way the first use was made of the elementary principles of geometry in the valley of the Nile. The earliest history discovers man tilling the soil in all parts of the world. Wheat was raised by the early Egyptians; rice by the people of the Netherlands Indies, China, and Japan, and corn and potatoes by the American Indians.

Farming a fundamental industry. All the people of a country depend upon the farmer. The people as a whole cannot enjoy any considerable degree of prosperity if the farmer is not prosperous. News of farm conditions are found in all city newspapers and in monthly bank reports. If crops are doing well, then the country is assured of supplies of food and certain kinds of raw materials. If



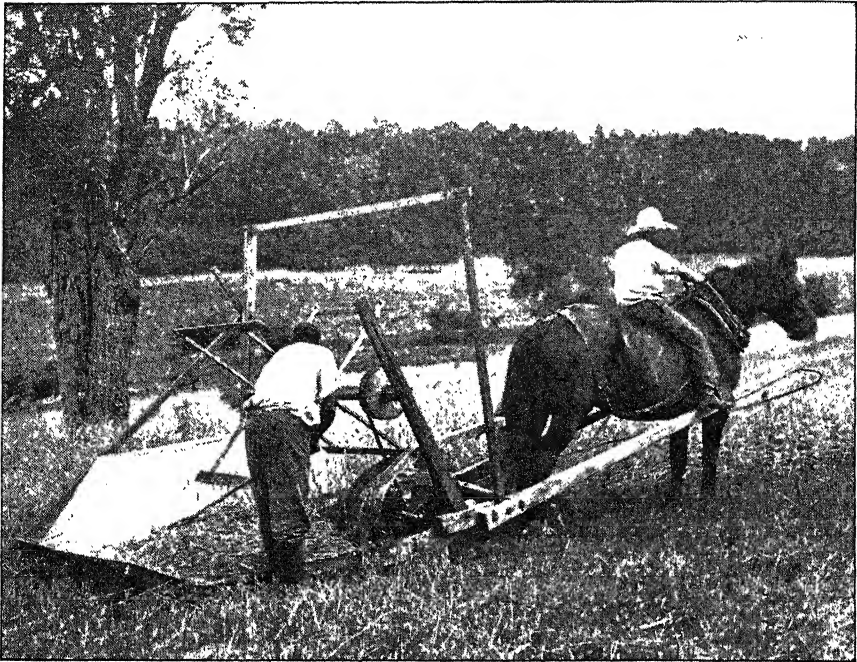
Photo by James Sawders

A field of sugar cane in the Cauca Valley of Colombia. Ox carts are used for transporting the cane to the mill. What kind of climate is necessary for the production of this crop? Name some other crops that such a climate would produce.

the farmer has large crops to sell at a fair price, then he will have money to buy the commodities needed on the farm. Farmers as a whole make up one of the largest buying groups of a country. Given this good market, manufacturers and business in general are likely to prosper. Transportation lines also look to the farmer for much of their business. Farm products must go out, and equipment and other necessities must move toward the farm.

Food for the millions. We speak of "starvation staring us in the face." We try to "keep the wolf from the door," again meaning hunger. It is to the farmer that we must look to ward off this danger. In colonial times each person provided his own necessities including food. In time the work of the community was divided; the farmer did his work, and the blacksmith, the shoemaker, and the storekeeper his. With the opening up of new farm lands, such as our own Central Plains, the farmer became even more of a specialist. He became a wheat farmer, a raiser of corn or cotton, a breeder of cattle. In so doing, he supplied his own family and other parts of the country as well. In a number of countries like our own, there have been wheat, corn, cotton, and meats to spare for export.

With the coming of the steamships and the railroads, the great grain fields and cattle ranches of the United States, Canada, Argen-



Courtesy International Harvester Company

McCormick's first reaper was a rather crude implement compared to the modern machines made by the International Harvester Company for cutting grain.

tina, Uruguay, and a few other countries were brought close to the millions of workers in industrial Europe. In European countries the prices of foods fell. European farmers were obliged to raise less grain and turn to a more intensive type of agriculture. They became producers of milk, butter, cheese, and poultry. Since the area they could devote to farming was small, they found it necessary to import feed for cattle and poultry from the grain lands of other countries. The greatest importers of grain as food for the people and feed for domestic animals have been the industrial countries of Northwestern Europe.

Farming by machines. Production of grain in quantities sufficient for export, however, awaited the invention of farm machinery—the gang plow, the drill, the harvester, the thresher, and the combine. The reaper, invented by Cyrus Hall McCormick, wrought a revolution in the production of grain. It is said that his invention caused civilization in the United States to move westward thirty miles per year. McCormick invented the reaper in Virginia, but the great need of the invention was on the great plains of the Middle West. Therefore, in Chicago McCormick set up his factory which even-



Photo by James Sawders

A wheat field near Gettysburg, Pennsylvania. Some wheat is raised in nearly every state, but of course we look for most of our wheat to the plains of the Middle West.

tually developed into the International Harvester Company. On his way from Virginia to the West, McCormick saw great fields of grain—some of them rotting because there were not enough men to harvest them by hand. In other fields cattle were feeding on the unharvested grain. Here was a land offering unlimited market for McCormick's machines. Since then these and similar machines have been used all over the grain-producing world. When the planting season arrives in large wheat-growing areas, there are thousands of acres to be planted in a comparatively short time. In Russia, at times, the airplane has been used to scatter the seed over the fields.

Wheat—the staff of life. No one knows how long man has grown wheat. Grains of wheat have been found in prehistoric tombs, and the oldest records speak of the grain. All the plants which give man much of his food and clothing once grew wild or were developed from wild plants. Wheat was no doubt simply a wild grass which man has so cultivated and improved that it produces seeds more abundantly and of much better quality than in the wild state.

Wheat is widely used. No other flour is so popular as wheat flour. Wheat has no equal for making bread because of the sticky gluten which it contains. The gluten forms a dough which is expanded by yeast or baking powder to make a light, fluffy loaf. Wheat flour is also used in making cakes, pastry, breakfast foods, and macaroni.

To meet the world-wide demand wheat is grown in every continent and is exported from one or more of the countries of each continent. In normal times it is one of the world's greatest articles of commerce.

How wheat is raised. With the use of machinery one man can cultivate an enormous area of land. In the spring-wheat region as soon as the frost is out of the ground, the land is plowed by gang plows drawn by large tractors. The grain is planted by machines, called *drills*, in rows six or seven inches apart instead of being scattered by hand as in our forefathers' time. As growth takes place, the ground is covered by a carpet of plants which change from green to golden yellow as the grain ripens. No other work is necessary until harvest. Wheat is harvested by large machines, known as *binders*, which cut the grain and tie it into bundles; or, if it is thoroughly dried, the combined harvester and thresher is used. This machine, known as a *combine*, not only cuts the wheat but threshes it; that is, it separates the grain from the husks and straw and puts the grain in sacks ready for transportation.

Wheat the world over. While our country is a great producer of wheat, it is no longer the leading nation. For a number of years Russia led all other countries. The countries of Europe combined produced about four times as much wheat as the United States. Next to Russia the chief producing countries of Europe were France, Italy, and Germany. Other important wheat-producing countries are India, Canada, Argentina, Australia, and China.

World trade in wheat. A country may raise a great many bushels of wheat and yet have little to sell because it is needed for its own large population. The greatest exporters of wheat have been Canada, Argentina, and Australia, not because they were the largest producers but because their home needs are not great in proportion to their production.

Great Britain in normal times imported more than one half as much as all other countries combined. The other wheat-importing countries have been mainly those of Western Europe where the occupations are chiefly industrial and the population is crowded.



Courtesy Caterpillar Tractor Company

A corn harvester at work. Note that it harvests the corn and removes the husks all in one process. Only here and there a husk remains on the ears of corn.

Countries outside Europe that imported considerable quantities were Brazil and Japan.

Corn, the king of crops. Early explorers in both North America and South America found the Indians raising corn. It helped to save the lives of the Plymouth colonists. As the country grew, the corn acreage increased. It became the leading crop of the Middle West. It feeds our hogs, fattens our cattle, and in various forms serves as food for man. Corn also comes to our table in the form of beef, pork, and dairy products. In those same forms it is exported to other lands.

Corn is the one grain that America has given the world. With the improvement of the seed by selection and cross breeding it has

become possible to grow it farther north where the seasons are shorter and also in regions of comparatively light rainfall. By the same methods the yield per acre has been greatly increased.

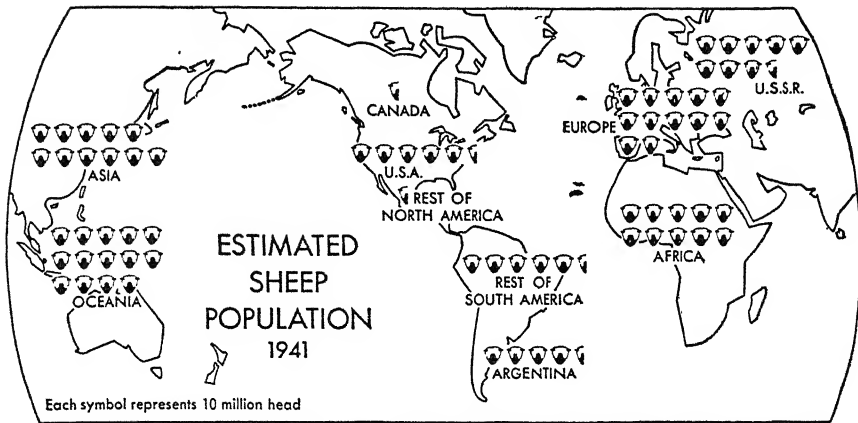
Corn in other lands. Our country produces about one half of the world's corn crop. Other leading producing countries are Argentina, Brazil, Russia, and Rumania. Argentina's crop is about one eighth that of the United States, yet it supplies about two thirds of the world's exported corn. The countries of Western Europe with dense population and stall-fed cattle have been the largest importers of corn.

Rice cultivation. Nearly half the people of the world depend upon rice as their most important article of food. This grain thrives best in countries having warm moist summers; therefore the chief producing regions are in the monsoon regions of India, southeastern Asia, and the East Indies. The rice crop with its heavy yield per acre makes possible the dense population of the Far East.

With the exception of the plowing of the land with the water buffalo all the work in the oriental rice fields is done by hand. In the fields rendered muddy by irrigation waters, each plant is set out by hand. Cultivation is also carried on by slow, back-breaking hard work. Harvesting, threshing, and winnowing also are done by hand. Labor is plentiful and cheap. Much of the work is done by women and children.

In the United States quite different methods are used. On the low, wet lands of Texas, Louisiana, and Arkansas millions of bushels of rice are raised by machine. The land is cultivated by machines as it is for wheat; then it is flooded. Before harvesting takes place the land is thoroughly drained, and then harvesting machines can move readily over the hard ground. Rice cultivated by machine can be produced as cheaply in the United States with well-paid labor as in the Far East where the daily wage has been as low as twenty-five or thirty cents a day.

Vegetables and fruits. Grains enter into foreign trade to a much greater extent than vegetables and fruit. These latter farm products, however, are becoming more and more an essential part of the diet of progressive peoples. With modern methods of preservation fresh vegetables and most kinds of fresh fruits are available in most places throughout the year. To reduce the space needed to transport vegetables to our men in service all over the world and to meet the needs of our lend-lease program, many vegetables are dried, or dehydrated. When soaked in water, the dried vegetables



Pictograph Corporation for the Coördinator of Inter-American Affairs

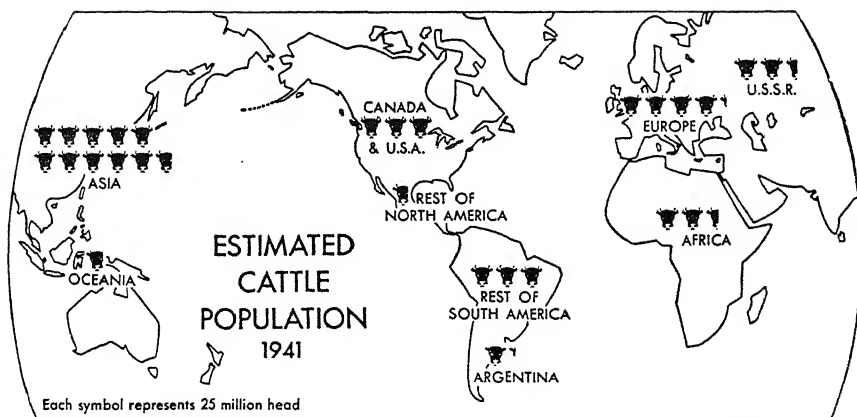
The sheep of Australia and New Zealand play a very large part in the world's commerce. Both these countries normally export large quantities of wool and mutton.

are found to be as tasty as when fresh. It is said that enough dehydrated potatoes to serve a hundred men could be placed in an ordinary shoe box. The dehydration plants of Aroostook County, Maine, process many thousands of bushels of potatoes each year.

Meat and clothing from grass and grain. One of the first things done by prehistoric man to improve his living conditions was to *domesticate*, or tame, the animals which he found running wild about him. In the earliest Scripture stories we read of domesticated flocks and herds. Our life today would be barren indeed if we did not have the products of these domestic animals. Our meat would be limited to that furnished by hunters. We would have few eggs and very little butter, milk, or cheese. Leather and wool would be scarce and poor; and even transportation would be undeveloped.

Our whole history would be different if man had not tamed the horse, the cow, the ox, the camel, the sheep, the hog, the water buffalo, the elephant, the reindeer, the llama, the dog, the yak, the goat, and other animals which have been our faithful servants for thousands of years. These animals not only supply a large amount of our food and raw materials, they have also been invaluable aids in travel and transportation all over the world. The meat, dairy, leather, and woollen industries employ many thousands of workers in our country, and the combined value of these products easily exceeds that of all other American manufactures.

Before the development of water, steam, and electric power, beasts of burden did all our heavy work and were our chief means of travel and transportation. Even now the horse and mule are



Pictograph Corporation for the Coördinator of Inter-American Affairs

The cattle of the United States, Canada, Australia, New Zealand, and Europe are raised very largely for dairy products; those of Argentine and Brazil are raised mostly for beef; while those of southeastern Asia are kept chiefly as work animals.

widely used in America; and in less progressive parts of the world beasts of burden are indispensable. The army mule is still an important factor in the mechanized army. He proved his worth in the Allies' successful campaign in North Africa.

Where our domestic animals came from. Cattle are believed to have originated in the forests and grassy plains of Europe and Asia. They were first brought to America by the French and English settlers of the Atlantic Coast and by the Spanish who conquered Mexico. From the Atlantic Coast they gradually spread out into Canada and into our Middle West. From Mexico cattle were brought to Texas, to New Mexico, and to California. The different breeds of American cattle have thus been developed from those brought from different parts of Europe. The English and Dutch have for centuries been raising special breeds for both dairy and meat production. Spanish cattle have also been skillfully bred. When these various breeds were brought to America, our farmers continued to experiment; and from their efforts we now have a highly developed science of cattle breeding. The United States Department of Agriculture, State Agricultural Departments, Agricultural Colleges, and individual ranchers have done much to improve the quality of our domestic animals.

RAW MATERIALS

Raw materials from the farm. The grains and other foods are in a sense raw materials. Wheat is a raw material for the flour mill;

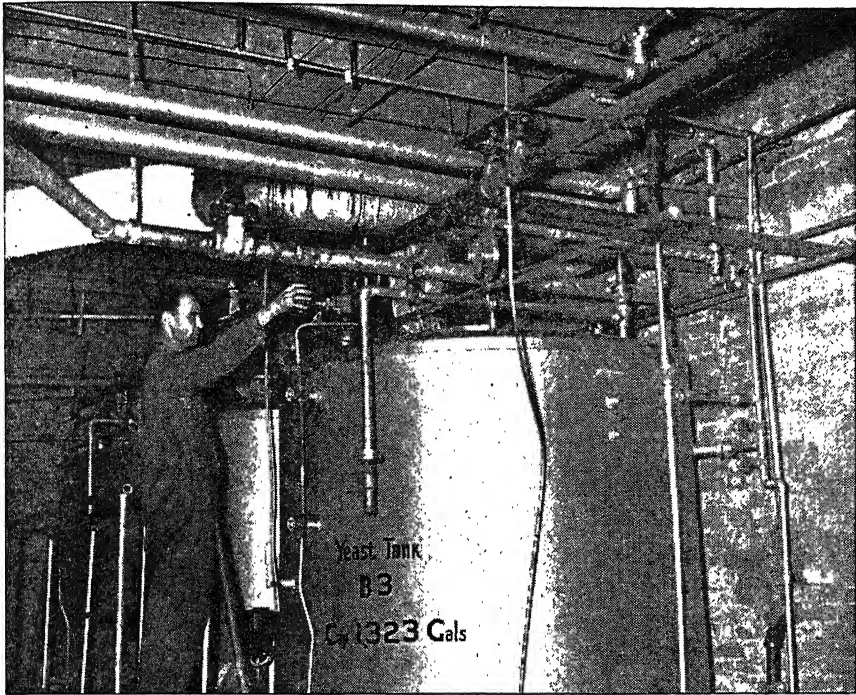


Photo from J. W. McManigal

The manufacture of agrol, industrial alcohol, from farm products. Agrol is used as motorcar fuel. Before the war, when there was a surplus of farm products, it was believed that this was one way of finding a new market for surplus grains and also a means of finding a substitute for gasoline.

so is corn and other grains for the factory producing breakfast foods. Vegetables and fruits are the raw materials for canneries and for frozen-food and dehydrating plants. Cotton, wool, linen, hemp, jute, and leather are also raw materials.

Fibers and their uses. Food, clothing, and shelter have always been the primary needs of the human race. Man's efforts to provide for these needs have given rise to his great occupations. The earliest clothing used was made from the skins of animals, from grasses, and from the bark of trees. No great variety of wearing apparel was possible with these simple materials and we may feel sure that not much attention was given to style of dress. With the discovery of fibers suitable for textiles people gradually learned how to spin and weave. This new knowledge did much to solve the clothing problem. We do not know when men first learned to use fibers but the search for new ones is still going on.

Fibers to be useful must be fine, strong, and flexible but never brittle. The most valuable ones now in use are cotton, wool, linen,

silk, rayon, and nylon. These are the most valuable for clothing and for household uses. Others such as jute, hemp, and sisal are not used for clothing but serve as the raw material for many articles used in agriculture and industry. We owe much to the people of long ago who discovered the use of fibers and learned how to spin and weave them.

COTTON

Raw cotton. The cotton plant bears a seed pod called the *boll*, in which the seeds are wrapped in closely packed fibers. When the boll ripens, it bursts open and exposes the mass of white fibers. These fibers are known as *raw cotton*. Being light and easily spun into yarn and thread, cotton makes an ideal textile material.

The uses of cotton. The chief use of cotton is for clothing, and for this purpose it is woven into a great many different kinds of cloth. Some are thick and heavy, while others are thin and delicate. Cotton is also mixed with other materials, such as wool, silk, and rayon. Cotton is used for many other articles besides clothing. Sheets, curtains, table covers, and many other household necessities are made largely of cotton. It also enters into the manufacture of floor coverings, tires, rubber hose, paper, and rayon. Recently wide strips of cotton fabric have been used in building roads. List all the uses for cotton which you can find.

The history of cotton. Cotton is not mentioned in the Scriptures, which often refer to silk, wool, and linen. The ancient Greeks, Egyptians, Chinese, and Hindus had some knowledge of cotton and wove rich fabrics from it. In those days and even as late as the eighteenth century cotton was a very expensive article. The separation of the fibers from the seed was a slow and costly process requiring skilled hand labor. In colonial days cotton was not in wide use, even in the southern colonies where it was raised.

The invention of spinning and weaving machinery in England at about the same time and the use of steam power in the mills, combined with the sharp drop in the price of raw cotton, made Great Britain the leading cotton-manufacturing country of the world. The increased use of cotton also brought wealth to the Southern States, which still lead the world in the production of this fiber.

Cotton for the mills. The invention of the cotton gin in 1793 was the one greatest stimulus to the production of cotton. Following this invention the growing of cotton in the United States increased by leaps and bounds. Ever since that time the United States has led

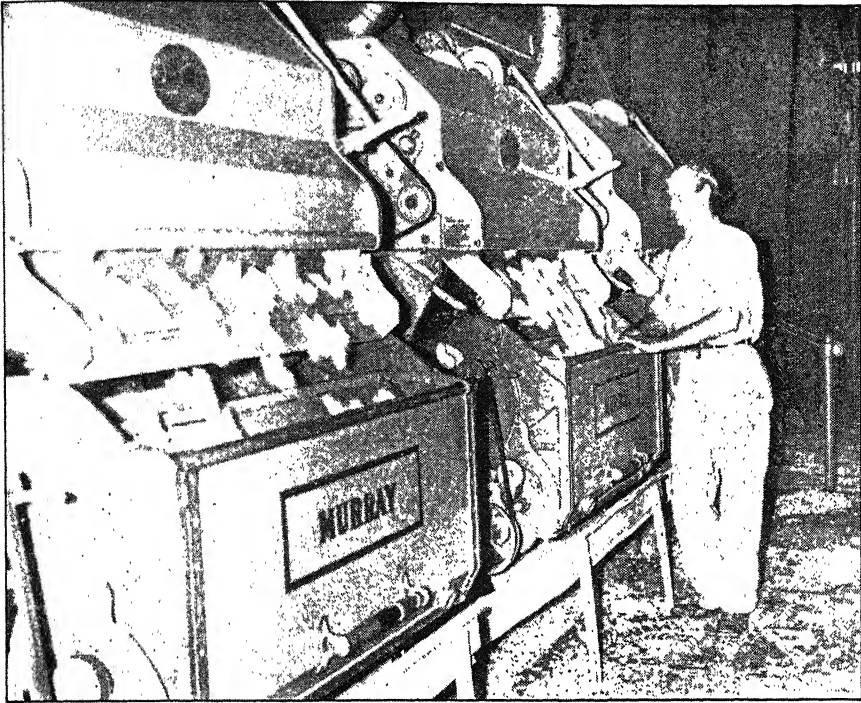


Photo by James Saunders

The interior of a cotton gin. This large complicated machine which removes the seed from cotton is a great improvement over the simple gin invented by Eli Whitney.

the world in the production and exportation of cotton. Other countries producing large quantities of this fiber are India, China, Brazil, and Egypt. Cotton goods find a larger market than any other textile for the reason that by far the greater proportion of the world's inhabitants live in warm climates where warm clothing is not required. More than half the people of the world live in southern and southeastern Asia and the East Indies. Cotton clothing is all that is needed by the more than one billion people of these regions. However, large quantities of cotton goods are used by people living in the cooler regions of the world.

WOOL

Wool from the ranch. Another important fiber produced by the farmer on the ranch is wool. Cloth made from wool is durable and warm. For that reason woolen clothing is preferable to cotton in cold seasons and cold countries. Wool is woven in many different ways and makes very beautiful and durable fabrics. Besides its use



Photo by James Sawders

A sheep ranch in New Zealand. This country is changing from a wool-producing sheep to one raised primarily for mutton. Like Australia the market for its mutton is mainly Great Britain.

for clothing, wool is used for shawls, scarfs, bedding, rugs, and carpets. It is the most ancient textile known.

Sheep in history. In our earliest historical records we read of the sheep as a domesticated animal. Flocks of sheep were one of the first forms of wealth. In early religious rites young sheep were sacrificed as burnt offerings. In the days of Queen Elizabeth wool was so valuable a source of national wealth that an act was passed forbidding its exportation. To celebrate the act a large wool sack was placed in the House of Lords as a seat for the Lord Chancellor. To-day the Chancellor still sits on a sack of wool and his office has come to be familiarly called the "Woolsack." Wool from the sheep's fleece made the earliest form of woven cloth; and the skins of sheep were used both for clothing and shelter. Their flesh was one of the first kinds of meat to be used as man passed out of the hunting stage.

Sheep are well suited for life in the dry, semidesert regions. They can eat coarse grasses and even weeds and shrubs which are not relished by cattle. Their small muzzles and sharp teeth enable them to clip vegetation very close to the ground. Besides this, they are so light and sure-footed that they can climb rough slopes and, therefore, thrive in regions too hilly for cattle. Consequently, we find sheep scattered very widely over the entire world.

Kinds of sheep. Sheep give us wool for weaving and mutton for food. While all sheep produce fleeces from which wool is spun, scientific breeding has produced several types which excel in wool production. Our chief wool producer is the Merino, or Spanish type of sheep. For mutton our best type is the Southdown, which is of English origin. There are crossbred types of sheep which give good yields of both wool and mutton. These are especially numerous in Australia, which is the greatest sheep-raising region of the world.

In the early days of our country practically every farmer kept some sheep and used the wool to make homespun cloth. This home industry continued until the introduction of cotton-manufacturing machinery led to the use of similar machines in making woolen cloth. Gradually woolen mills took the place of the home industry, and the old spinning wheels and hand looms were discarded. These old implements are very rare today and are eagerly sought by collectors of antiques.

OTHER FIBERS

Linen, hemp, and jute. Other fibers produced by the farmer are linen, true hemp, and jute. True hemp is raised in small quantities since it has not been able to compete with the cheaper rope-making fibers, Manila hemp and sisal. Linen, or flax fiber, is produced in countries where the labor cost is comparatively low as in Northern Ireland, Belgium, the Baltic States, and Russia. Jute is used in making burlap bags and as sacks for wool and a covering for bales of cotton. Practically all the enormous quantities of jute used the world over have been raised in a small area in the vicinity of Calcutta.

FERTILIZERS

On the subsistence farm there is a very close relation between cattle raising and the raising of crops. Crops are raised for the family and for the cattle, and the barnyard manure is used for fertilizing the crops. When the farmer engages in agriculture on a larger scale,

other sources of fertilizer must be sought. For many years guano, the excrement from millions of sea birds, was carried all over the world from the Chincha Islands off the west coast of South America. When those supplies were exhausted, chemists came to the rescue with the so-called commercial fertilizers.

Fertility must be restored to the soil. All growing plants take certain elements from the soil in which they grow. These elements are called *plant food*, and each crop reduces the supply of plant food in the soil. If good yields are expected from farm or garden land, the plant food taken out by successive crops must be replaced. Substances added to the soil for this purpose are called *fertilizers*. Various kinds of animal manures and decayed vegetation are excellent for fertilizing the soil.

As a substitute for natural fertilizers farmers now use manufactured material called *commercial fertilizers*. These contain varying quantities of nitrogen, potassium, and phosphorus, which are among the most essential plant foods. Nitrogen increases leaf and seed growth; potassium helps to develop fruits; and phosphorus strengthens roots and hastens growth. Other elements are needed by plants, but these three are the most important and the most in need of replacement in the soil. Commercial fertilizers are superior to natural fertilizers in one respect: they can be varied so as to supply exactly the right amount of different plant foods. Thus there are special fertilizers for potatoes, grass, grains, fruits, and other crops. To supply the chemicals needed in commercial fertilizers our manufacturers have depended considerably on other nations.

Sources of nitrogen. For many years most of the world's nitrogen came from the sodium-nitrate beds of Chile. Outside that country very little natural sodium nitrate has been found. On account of the limited supply of nitrogen deposits there would be danger of a complete lack of commercial fertilizers when these deposits were exhausted. However, there is an unlimited amount of nitrogen in the air; and today more and more nitrogen is being extracted from the air by the use of electricity. Norway, having a great supply of hydroelectric power, has led the world in the production and export of nitrogen compounds. German chemists have made many improvements in the methods of nitrogen extraction.

Ammonia, which is a by-product of coke manufacturing, also contains nitrogen, and its use in commercial-fertilizer production is increasing in the United States. We produce so much coke that it would easily be possible for us to secure all the fertilizer needed in

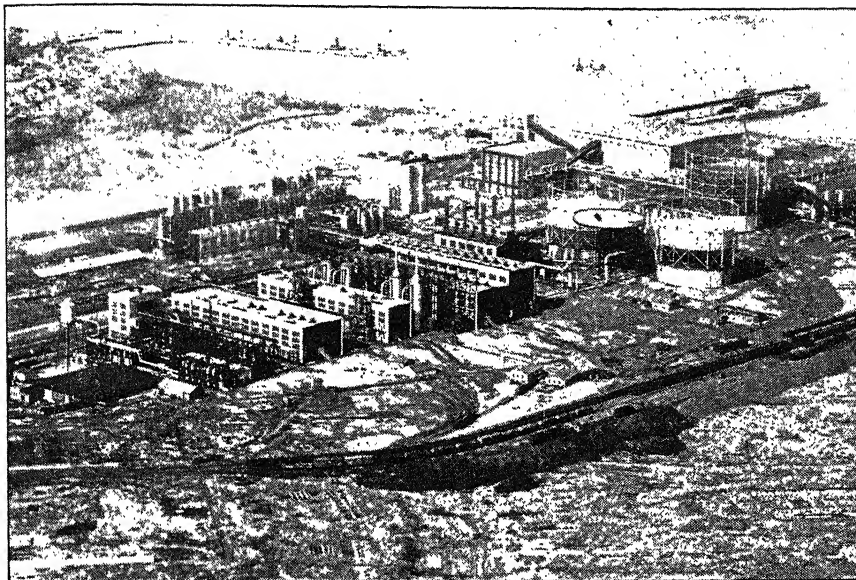


Photo by James Sawders

Nitrogen is extracted from the air at this plant in Hopewell, Virginia. The nitrogen is one of the chief constituents of fertilizer.

our country from ammonia. We also have great supplies of hydroelectric power which could be used in making nitrogen compounds. Nitrogen compounds are also used in explosives and consequently are important in time of war. It is therefore a great advantage for any country to have its own sources of supply. Germany was aided greatly in World War I by its ability to extract nitrogen from the air.

Sources of potash. Potash exists in nearly all rocks and soils, but it is almost always in an insoluble form. That is, it cannot be dissolved so that plants can use it. Chemists have so far been unable to make this insoluble potash available as a fertilizer. Until quite recently the only large deposits of soluble potash were in Germany and in Alsace. Some potash has been obtained from old lake beds in California and other Western States, and a small amount has been recovered by treating kelp, a kind of seaweed, found along the Pacific Coast. Before the beginning of World War II the amount of potash imported from Germany and France was large; we are now, however, discovering and developing our own potash resources. The states engaged in potash production are California, New Mexico, Texas, and Maryland.

Sources of phosphates. Chemical compounds which contain phosphorus are called *phosphates*. They are indispensable as plant

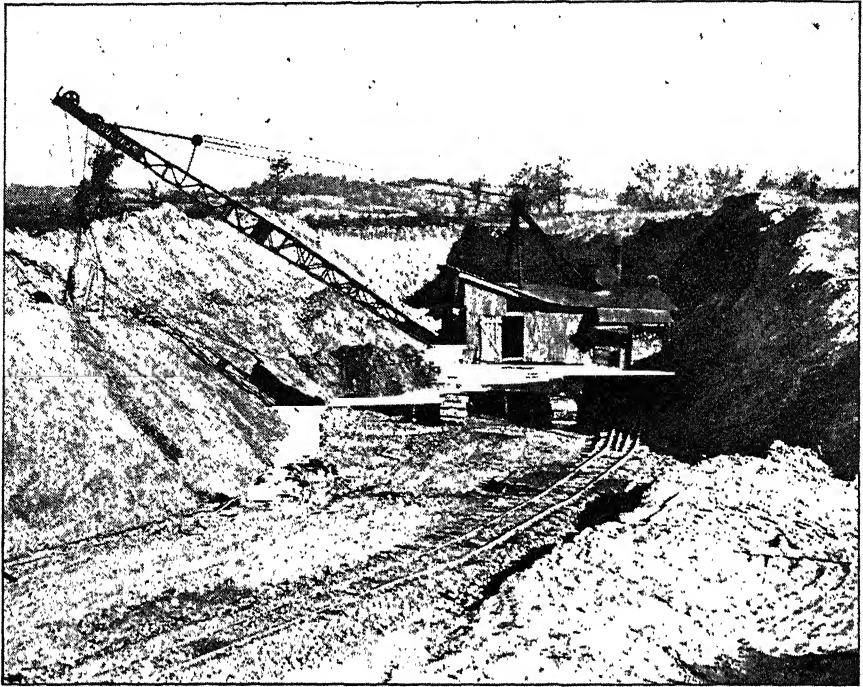


Photo from Triangle Photo Service

Phosphate mining near Mount Pleasant, Tennessee. Florida leads all our states in the production of this important fertilizer mineral and Tennessee comes second.

food. Bones contain phosphorus and ground-up bones, called *bone meal*, are highly prized as fertilizers. Formerly great quantities of buffalo bones were gathered on our western plains and used for this purpose. Now the bones and other waste from slaughterhouses and meat-packing plants are converted into fertilizers. Fish meal, prepared from the waste of fish canneries, is also rich in phosphates. The Japanese, having comparatively few farm animals, use great quantities of fish as fertilizer. The American Indians knew the value of fish as a plant food, and they taught the Pilgrims to place a fish or two in each hill of corn that they planted. Phosphates are also found in the *slag*, or waste material, of iron smelting. This slag is ground into a fine powder which greatly enriches the soil. Common coal ashes also contain some phosphate. But our most plentiful supply of phosphates comes from the skeletons of prehistoric animals found in certain rocks. In order to make the phosphate in these rocks soluble, so that it may be taken up by plant roots, the rock is treated with sulphuric acid. It is then known as superphosphate and is familiar to all users of fertilizers.

Fortunately the United States has an abundant supply of phosphate rock. No other country is so well supplied. Florida, Tennessee, and South Carolina produce most of our phosphate at present, but there are vast beds of this rock in Montana, Idaho, Utah, and Wyoming which have scarcely been touched.

GUIDES TO STUDY

1. Why is work a blessing?
2. Show that much of the world's work is for the purpose of turning natural resources to man's use.
3. How does our life today differ from that of the pioneer?
4. How was early civilization related to agriculture?
5. Why is farming a fundamental industry?
6. How do workers in all occupations depend upon the farmer?
7. How have McCormick and other inventors of farm machines helped the farmer? How have they helped all mankind?
8. Why has wheat come to be one of man's most important foods?
9. How is wheat raised?
10. What countries lead in the production of wheat? In what latitudes does wheat thrive best? Why?
11. Why does wheat enter so largely into world trade?
12. Why is corn one of the most important crops produced in our country?
13. Compare the methods employed in raising rice in the Far East with those in use in our Southern States.
14. Why are we giving more and more attention to the raising of vegetables?
15. What has man gained by domesticating animals? Which of man's wants are satisfied by them?
16. What has been gained by the careful breeding of domestic animals?
17. What are some of the raw materials produced on the farm?
18. What are some of the many uses of cotton?
19. Give the history of the cotton industry.
20. List the leading cotton-producing countries. The leading cotton-manufacturing countries.
21. What has been the importance of wool in past centuries?
22. What is the importance of wool at the present time in everyday life? In supplying the needs of our armed forces?
23. What use is made of linen? Hemp? Jute?
24. Why are fertilizers needed and what is the particular value of each type?
25. What are the various sources of our fertilizers?

TOPICS FOR CLASS DISCUSSION

1. Emigrants and pioneers.
2. The advantages of specialized occupations.
3. How the rest of the world depends upon the farmer.
4. Machines on the farm.

5. The origin of domesticated plants and animals.
6. How our crops of wheat and corn help to make the whole country prosperous.
7. The preservation of vegetables and fruits.
8. The importance of Eli Whitney's invention.
9. Sheep, the world over.
10. Nature's fertilizers and commercial fertilizers.

WORK TO BE DONE

1. On an outline map of the world indicate the wheat-growing regions. The corn-growing regions.
2. Bring to class newspaper clippings and pictures from newspapers and magazines having to do with crops and methods of farming.
3. Appoint a committee to study and report on one or more of the "Topics for Class Discussion" previously listed.
4. Study the problems confronting the farmer and the ways in which the State and Federal Governments aid the farmer.
5. Appoint a chairman and after thorough study discuss some of the following subjects: (1) Areas where farming by means of irrigation has turned deserts into richly producing regions; (2) Compare farming methods in the United States with those in selected European or Asiatic countries; (3) How war stimulates farming; (4) Dry farming, where it is practiced, and with what results; (5) How varieties of plants and breeds of animals have been improved.

2. FISHING—A GLOBAL INDUSTRY

The fisherman. No other occupation has helped man to know the world as has fishing. Fishing is carried on in Arctic waters, in those of the Antarctic, and in all the seas between. No one need tell the fisherman that this is a global world. He was the first to venture into strange seas. The fishing industry is not limited to ocean waters; the inland waters—rivers, lakes, and ponds yield great quantities of fish. When such waters are exhausted by sportsmen or regular fishermen, they may be restocked with fish adapted to the region.

Fishing led to the building of boats, to the use of sails, to the discovery of new seas and new shores. Fishermen learned slowly the art of navigation—how safely and successfully to traverse the sea lanes of the world. Fishing not only provided a livelihood, but it offered a field of adventure as well. As the fisherman visited new shores, he gained new ideas and thus in some measure furthered human progress.

Fishing founded towns and cities. It has been said that wherever a school of herring touched the shores of Norway or Britain

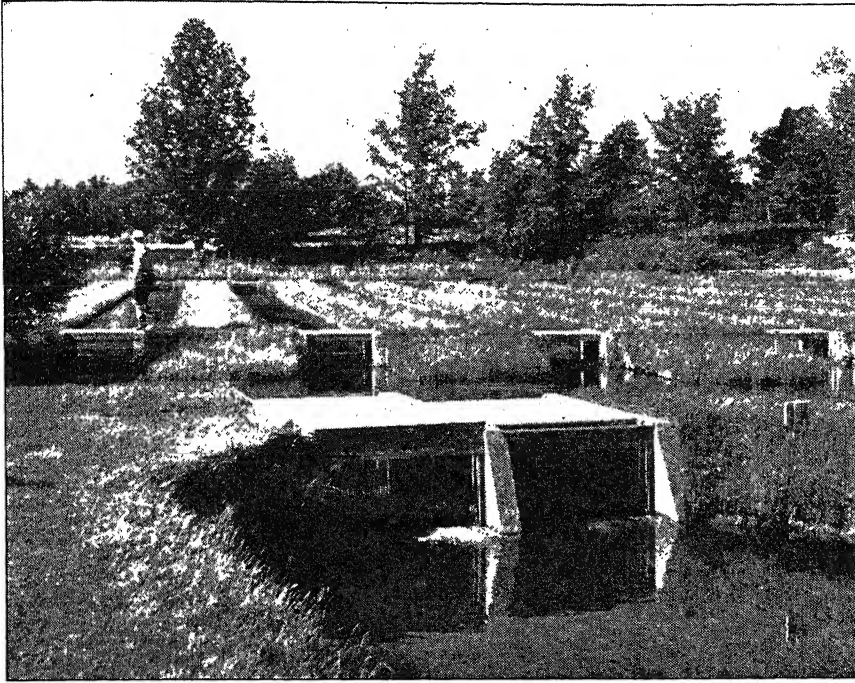


Photo by James Saunders

A United States fish hatchery in Michigan. Fish of different sizes are kept in different pools. Rainbow and brook trout are bred here to stock lakes and streams.

there a village or even a city grew up. As British fishermen learned how to navigate ships, they gained courage, became traders and explorers, and sought new shores which they claimed in the name of the king or queen of England. It was largely in this way that the great British Empire was built up. Even before the discovery of America, European fishermen visited the rich fishing grounds of the Grand Banks off Newfoundland.

Then merchant ships were built to be used only for carrying goods from port to port, from country to country. Thus developed the great merchant fleets of Britain, Norway, and the Netherlands. The rising importance of the Netherlands as a fishing country and later as a trading country dates from about the year 1500 when the herring ceased to enter the Baltic Sea and found their best feeding grounds in the North Sea. The naval strength of Great Britain, France, Spain, and other countries was a direct outgrowth of the fishing fleets. Every fishing vessel was a school for seamanship, and it was from these schools that men were selected for the navies of maritime countries.

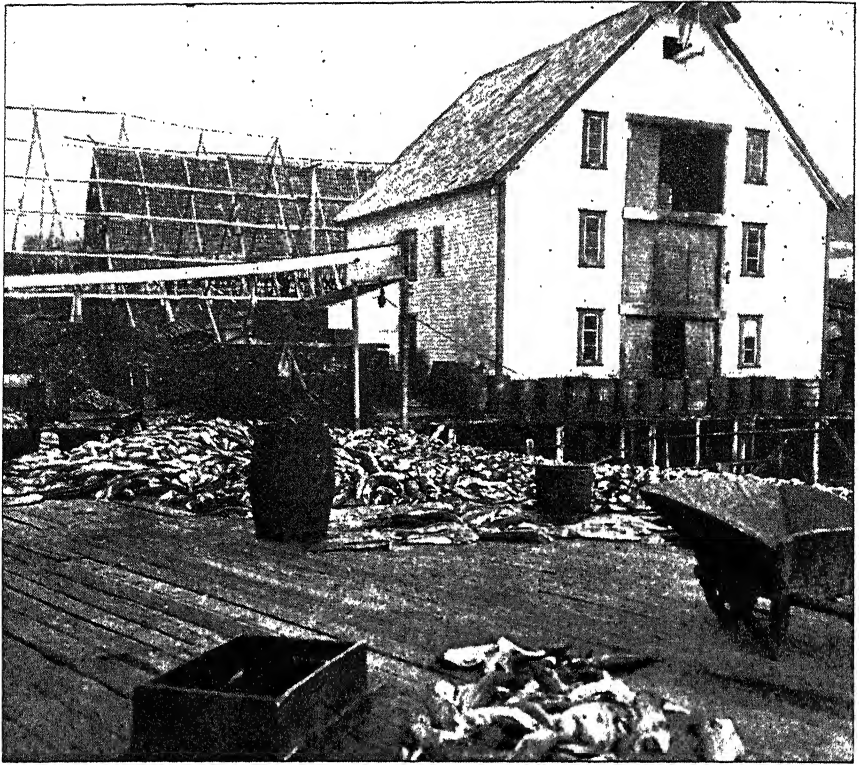
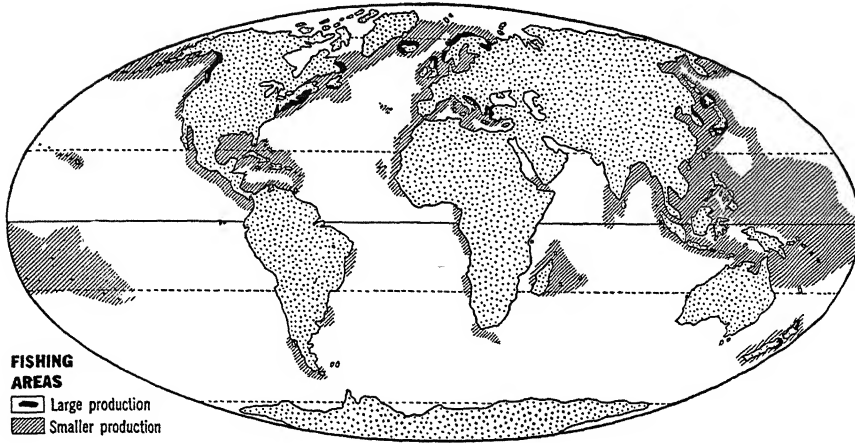


Photo by Lionel Green from Frederic Lewis

A fresh catch of codfish on the wharf at Hammerfest, Norway. The heads are used for fertilizer, the livers for oil, and the rest is dried and sold for food.

Fishing grounds. The best fishing grounds of the world are in the cool shallow waters of the northern hemisphere. The North Sea has supplied enormous quantities of sea food to all of Northwestern Europe. The leading fishing ports of the world are those of the east coast of England. Norway has not only fished the waters near home, but its fishermen have sought whales in both the Arctic and the Antarctic. Whale fishermen realized the importance of the polar regions many years ago. Norwegians look to the countries of Southern Europe and even to the United States as markets for the products of their fishermen. Norwegian cod-liver oil is known to every American youngster.

The countries of Southwestern Europe have long made fishing one of their chief occupations. French sardines have found a ready sale far beyond the shores of France. For centuries and even up to the beginning of World War II French fishing vessels visited the Newfoundland Banks. The French have tenaciously held the little



islands of St. Pierre and Miquelon as western outposts of their fishing industry.

East and West Coast fisheries. In the western Atlantic, however, the chief centers for fishing are the ports of northeastern United States and eastern Canada. Boston and Gloucester are the leading fishing ports of the Western world. Fish from the eastern ports are shipped in various forms westward, even to the Pacific Coast. On the Pacific Coast of the United States salmon fishing leads all others. The fish are caught chiefly in the rivers as they make their way to the spawning grounds. In building the Bonneville Dam not far from Portland, Oregon, it was necessary to construct a fish ladder and other devices to enable the fish to ascend the river for spawning. The devices have proved successful and thus a \$10,000,000 industry has been saved.

Fishing and spying. In the western Pacific Japan leads all other countries in the fishing industry. Fish are caught by the Japanese in the waters surrounding the islands of Japan, off the Pacific Coast of the United States and Canada, and near the shores of eastern Siberia. Russia and Japan determine by treaty the conditions governing the fisheries off the east coast of Siberia. Ten per cent of Japan's catch of fish comes from Russian waters. Perhaps no other country relies upon fish as an essential article of diet as does Japan. Rice and fish constitute the chief items in the daily menu. The soldier in the field as well as the citizen at home relies mainly on these two foods. Because of Japan's small land area and very dense population fish serves as a welcome addition to the meager productions of the Japanese soil. Japan ordinarily exports large quantities of fish. From that

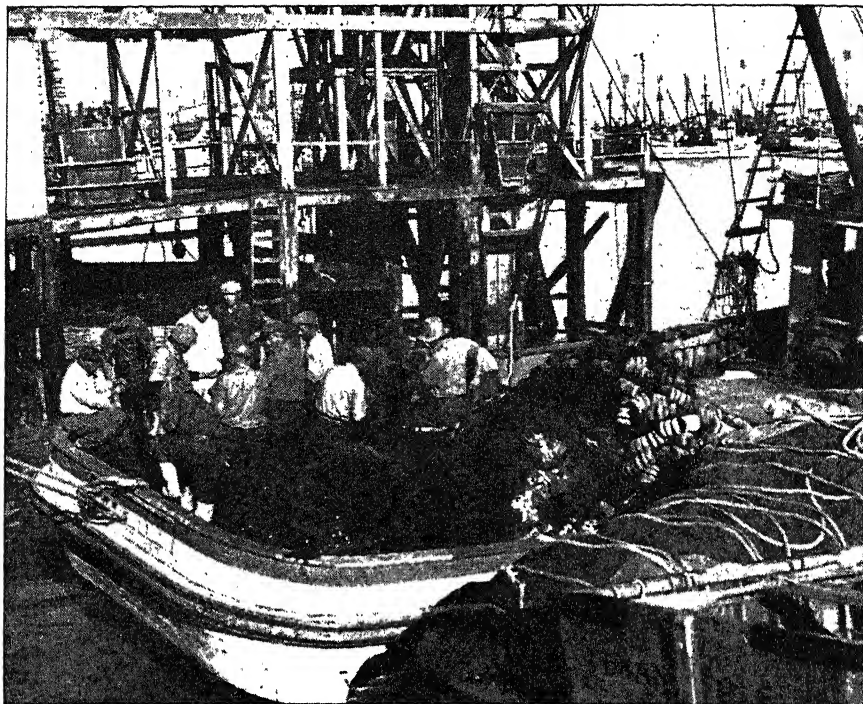


Photo by James Sawders

Japanese fishing boats at San Pedro, the port of Los Angeles. Before Pearl Harbor much of the fishing off our Pacific Coast was done by the Japanese.

country swordfish, canned tuna, and canned crab meat were sent to the United States. It was through their fishermen and other Japanese posing as fishermen that Japanese naval officials gained a detailed knowledge of the islands and shores of the Pacific.

GUIDES TO STUDY

1. How has the fishing industry been a great help to world progress?
2. How are other industries stimulated by fisheries?
3. Where are fish found in largest numbers? Why?
4. What are some of the countries which have important fisheries?
5. Where are the leading fishing ports of our country? What kinds of fish are caught off our eastern coast? Off the western coast?
6. What part have the Japanese played in the fisheries of the Pacific?
7. What are the different methods of preserving fish?
8. What are fish hatcheries and what purpose do they serve?

TOPICS FOR CLASS DISCUSSION

1. The life of the fisherman.
2. Fishing in foreign lands.

3. By-products of the fishing industry.
4. The world's great fishing ports.

WORK TO BE DONE

1. On an outline map of the world indicate the chief fishing grounds.
2. Prepare an exhibit consisting of homemade boats and fishing equipment, also pictures, maps, graphs, and products of the fishing industry.
3. Appoint committees to study and report to the class on topics suggested above.
4. Make a list of the kinds of fish imported from other countries including the country from which each product comes. (Study labels on cans in the home and in the grocery stores.)

3. LUMBERING—MAN'S USE OF THE FORESTS

First uses of the forests. "The groves were God's first temples." In them man learned to worship. The columns and the arches of man-made churches and cathedrals are patterned after those of the forest. It may be that forests seemed sacred to early man because they gave him the necessities and the comforts of life. Primitive tribes of the past, like those of the present, found in the forest shelter from heat and cold, food from plants and animals, and protection from their enemies. As man learned to plant and harvest, it became necessary to clear the land so that he could use his simple tools and to remove the forest foliage so that his garden might have sunlight. He found that he could remove the forest shade in two ways. He could set fire to a portion of the forest and thus remove both trunks and foliage. The ashes from the fire helped to fertilize his crops. Another method followed by the American Indians and the early white settlers was to kill the trees by removing a strip of bark entirely around the tree. Corn was then planted among the dead trees.

Wood floats. From earliest times man has made use of the forests near the shore to build his boats—some by stretching the bark of trees or the skins of animals over a light framework of wood, and others by hollowing out the trunks of large trees. As his skill increased and tools were invented, the trees were cut into timbers, planks, and boards. It was then possible to build larger and stronger boats which gave him courage to venture farther and farther from his own shores. It was not until the middle of the last century that wood began to give way to steel for the building of ships.

The many uses of wood. There is hardly a human need which the forest does not help to supply. People in nearly every corner of the globe provide shelter by using wood in some form. After the



From a pencil painting by John Pratt Whitman

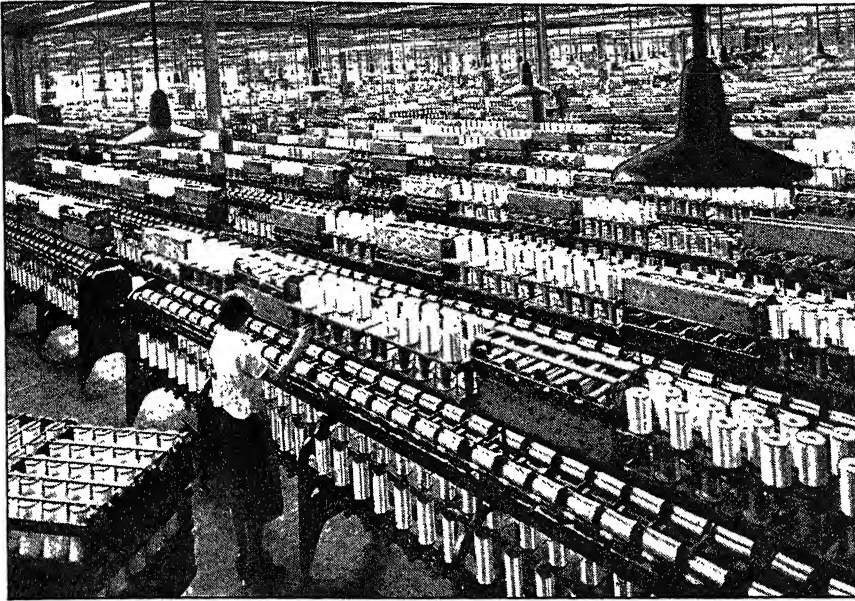
The Cathedral Beeches

house is completed, it is furnished with articles made largely of wood. Wood has been an important aid in transportation too, from the crudest carts and sleds of primitive peoples to the railways and airplanes of today. Large quantities of lumber are still used for ties even though railway cars are now made chiefly of steel.

Wood is also a great help in communication. Nearly all our paper whether for newsprint, business use, or books is made of wood pulp. Telephone and telegraph poles are of wood.

In recent years we have learned to clothe ourselves, not exactly with wood, but with rayon the chief source of which is cellulose from wood pulp. Rayon is rapidly taking the place of silk and to a less extent of cotton and wool. This same cellulose is also used in making lacquers for spraying automobiles and many other objects. It is also one source of plastics which in many ways are rapidly taking the place of wood, metal, bone, and hard rubber. Cellophane, another product of cellulose, is finding an almost unlimited number of uses. It protects that which it covers, at the same time leaving the article in full view of the purchaser.

Wood burns. There is no doubt that wood is used in a larger number of homes the world over than any other fuel. When we burn coal we burn trees and ferns that grew millions of years ago. Countless homes heated mainly by coal, oil, or gas burn wood in



Courtesy Celanese Corporation of America

View of a huge textile plant for the manufacture of celanese yarns from cellulose (cotton linters or wood pulp). Here the yarns are wound on spools and given the twist required for various cloths.

fireplaces because of the beauty and cheer which the wood fire gives. These are only a few of many ways in which the forests serve mankind. It is an unwise country indeed which does not conserve its forests and thus provide for future needs.

Lumber for building. More than half of the lumber of the United States is used in the construction of houses, barns, stores, and other buildings. In large cities and towns where buildings must be tall and fireproof, buildings are made of steel, stone, cement, and brick. Wood could not bear the weight of our skyscrapers. Even stone and brick require the support which only steel can give.

Building construction is one of our billion-dollar industries. The amount of building going on at any time is a measure of a country's prosperity. The construction of a building calls not only for lumber but for the use of equipment and supplies of many kinds. Men in many trades and professions find work to do when building is going on. And wherever this goes on, lumber is being used.

Furniture for homes and offices. Furniture making in this country had its beginnings in the early settlements along the Atlantic Coast. The styles followed those of the lands from which the settlers came, and designs were often remarkable for their beauty. Even

today many of them are regarded as masterpieces and are extensively imitated.

Much of the furniture both for homes and offices is made of wood. It is true that more and more office equipment made of steel is taking the place of that made of wood. Only the lumber used in the construction of buildings exceeds in value that used in making furniture. The leading furniture centers are in northern United States from New York and Pennsylvania on the east to Michigan and Ohio on the west. Grand Rapids, Michigan, once the leader in furniture production, is now surpassed by New York City and Chicago. Other centers of importance are in the Piedmont sections of Virginia and the Carolinas. Most of the furniture imported comes from Great Britain and consists chiefly of antiques.

Containers past and present. In former years the proprietors of retail stores of nearly all kinds received their goods in wood containers, in the form of either boxes or barrels. The dry-goods merchant and the druggist received their supplies in boxes, some large and some small. The grocer's flour, sugar, salt, lard, potatoes, apples, and vinegar came in barrels. Many other products sold by the grocer were brought to his store in wooden boxes varying in size. These boxes contained soap, starch, raisins, tobacco, and nearly everything else carried by the grocer.

Today, because lumber is much higher in price, fewer barrels and boxes are used. Instead, goods are packed in pasteboard cartons or in bags made of paper or cloth. Apples and many other fruits are often shipped in baskets which are lighter because they require the use of less wood and because they allow circulation of air which keeps the fruit in better condition.

Formerly cement and lime for building purposes or for fertilizer were shipped in casks or barrels. Now strong paper bags are commonly used. Petroleum when first transported from field to refinery and later to market was shipped in barrels. Even today the output of oil by countries or states is always given in number of barrels. Yet oil is now transported overland by pipe lines, by tank cars, or by trucks.

Even tin cans have in many circumstances taken the place of wood as containers for molasses, lubricating oils, paints, and many other articles in common use. Nevertheless lumber is still used to a great extent in making containers although wherever possible the material used is much lighter than when lumber was more plentiful and cheaper.

Wood flies. Douglas fir and other woods of the Pacific Northwest are being used extensively in the manufacture of airplanes. These woods are being used in training planes, bombers, fighters, transport planes, and gliders. Fighter planes owe much of their speed to their construction of light-weight plywood rather than of metal. On most of the British planes propellers are constructed of Douglas fir.

Since the first World War American planes have been constructed largely of metal. But with the demand for 200,000 planes the limited supply of aluminum compelled a search for substitute materials. Attention was called to the success of Canadian and British wood-built planes. As American plane-builders have striven to meet the large output of planes set by the President, they have turned to the use of wood in greater quantities.

The use of lumber for building planes increased more than five-fold in 1942. The demand for aircraft lumber will no doubt increase as time goes on. Most of the Douglas fir aircraft lumber produced in 1942 went to our European allies who evidently appreciated its value earlier than we did.

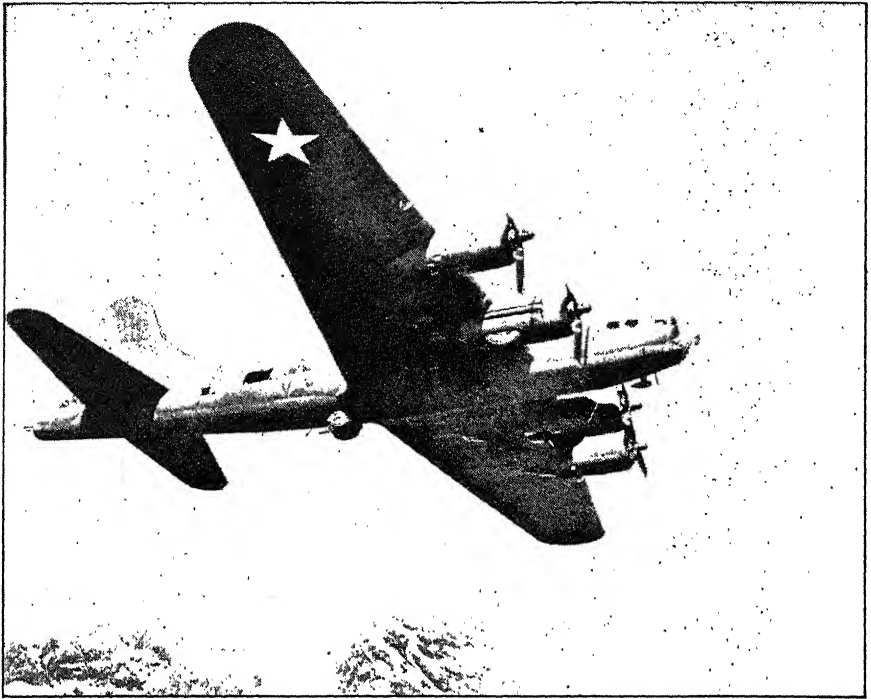
Every part of the plane was examined to see whether it could not be made from wood. As a result, planes made partly of wood and planes made wholly of wood began to emerge from the assembly lines in large numbers in all the plants of the Pacific Coast. Now thousands of gliders are being made either wholly or in part of plywood or light-weight wood construction.

Light and strong. The chief advantages of the use of wood in airplane construction are lightness and strength. It is claimed that pound for pound wood is stronger than steel. Planes made of ply-



Photo from Press Association, Inc.

Lumbermen felling a 1000-year-old spruce. Pound for pound the wood of this tree is stronger than steel. The lumber is used in making Mosquito bombers.



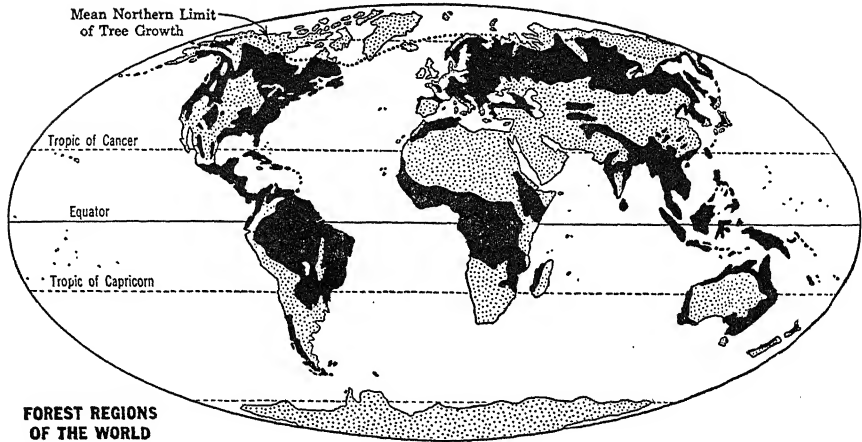
Courtesy Boeing News Bureau

A Boeing Flying Fortress making a test flight over Mt. Rainier in the state of Washington. Production of these planes has more than doubled since Pearl Harbor. They serve the Allied Nations on many battle fronts from Bering Sea to the Mediterranean.

wood—that is, several layers of thin wood strongly glued together, and in some cases subjected to heat and strong pressure—are known as flying sandwiches. Our planes of this type are found in every part of the world and for their special purposes are showing themselves inferior to none. English Mosquito bombers are made of wood, and wood is used in the construction of our small transport planes. It has been said that in the future the greatest difficulty of the Axis may come from the tops of the high trees of our Pacific Northwest.

Forests the world over. In almost every part of the world lumber is a necessity. Fortunately forests are widely distributed over the earth. Where lumber cannot be obtained, the people, as in some desert regions, live in tents made from the skins of animals. The Eskimo uses stones, driftwood, and skins but makes temporary shelters from blocks of snow and ice. Often stones are used for crude homes in regions where trees cannot grow.

Of all the continents Asia and South America have the largest



This map shows where forests have grown. Many of the regions have had their forests cut down.

forest areas. The forests of the Amazon Valley are almost unlimited; yet, because of the dense jungle and the difficulties of transportation, the region supplies but little lumber. The great forests of Asiatic Russia would be much more valuable if they were nearer areas of large population. Distances for much of this region make the cost of getting the lumber to market prohibitive.

Forest lands cover nearly one third of the continent of Europe. Northern Europe, including Norway, Sweden, Finland, and Russia, has extensive areas of very valuable forests of pine, spruce, and hemlock trees, which are useful for building purposes and for making paper pulp. In the more densely settled parts of Central Europe the forests are given much care so that a supply for the future will be assured. In those regions small twigs and bits of roots which we would consider fit only for a bonfire are bound into fagots for firewood to save the precious trees.

GUIDES TO STUDY

1. How are primitive peoples benefited by forests?
2. List as many uses of wood as you can.
3. In what parts of a country would we find the people using nothing but wood for fuel?
4. Where shall we find buildings made of wood, and where shall we find them made largely of brick, cement, and stone? Why the difference?
5. Why is the amount of building going on a measure of a country's prosperity?
6. What parts of the furniture in homes and offices are made of wood?

7. Why are fewer containers made of wood today than in former years? For what purposes are wooden barrels now used?
8. What other kinds of containers have taken the place of wood?
9. What part does wood take in the making of airplanes? What are its advantages?
10. What is plywood? List some of its many uses.
11. What countries lead in the extent of forest areas?

TOPICS FOR CLASS DISCUSSION

1. Uses of forests by the early settlers in America.
2. The conservation of lumber. The conservation of forests.
3. Kinds of wood used for building a house. For making furniture.
4. List the substitutes for wood.

WORK TO BE DONE

1. On an outline map of the world indicate the chief forest areas of each continent.
2. Make a list of the industries dependent wholly or in part on the forests.
3. Make a collection of different kinds of wood and other forest products.
4. Appoint a committee to study and report to class the many uses of cellulose.

4. MANUFACTURING—A MODERN INDUSTRY

Once manufacturing really was handwork. "To manufacture" means "to make by hand." Derived from two Latin words, the word *manufacture* tells exactly how things were made before machinery was invented. Very early in history men used such simple devices as the spinning wheel, the hand loom, the handsaw, the pulley, the plow, the cradle scythe, and many others; but we should hardly call any of these devices machines today.

Until after the Revolution most manufacturing was done in the homes. From the raw materials supplied by the farms all sorts of products were fashioned by handwork. Wool from the sheep and linen from flax were spun into yarn, woven into cloth, and made into clothing, blankets, and other household articles. Hides were tanned and shoes were made by hand, often by a traveling shoemaker. Iron was smelted in many places with the aid of charcoal, and farm tools and implements were laboriously hammered out by local blacksmiths or by the farmers themselves. Timber and planks were hewed out with axes and even furniture was homemade. Some of the handmade articles of the colonial days are highly prized now on account of their beauty and durability.



Photo by James Saunders

Spinning flax grown and prepared at Plymouth, Massachusetts. The room is in the old Harlow house built in Plymouth in 1667.

Machines are invented. Gradually men began to invent machines to take the place of hand labor. Sawmills cut and fashioned lumber accurately and rapidly. Water power was used to turn the wheels of gristmills where the farmer had his wheat and corn ground into flour and meal. Soon the English spinning and weaving machines were introduced into the United States, and the newly invented steam engine drove our first locomotives and steamboats. The machine age was born; and manufacturing ceased to be handwork. Hand skill still has a place in the operation of machines and in special kinds of work; but machines do nearly everything today. The making and assembling of machinery involves both manual skill and machine power. Even electricity, the modern power, requires all kinds of machinery in its generation, transmission, and use. Thus, while machines have increased our production enormously, they have given employment to many thousands of people in their building and operation.

What machines do. Machines enter into practically every ac-

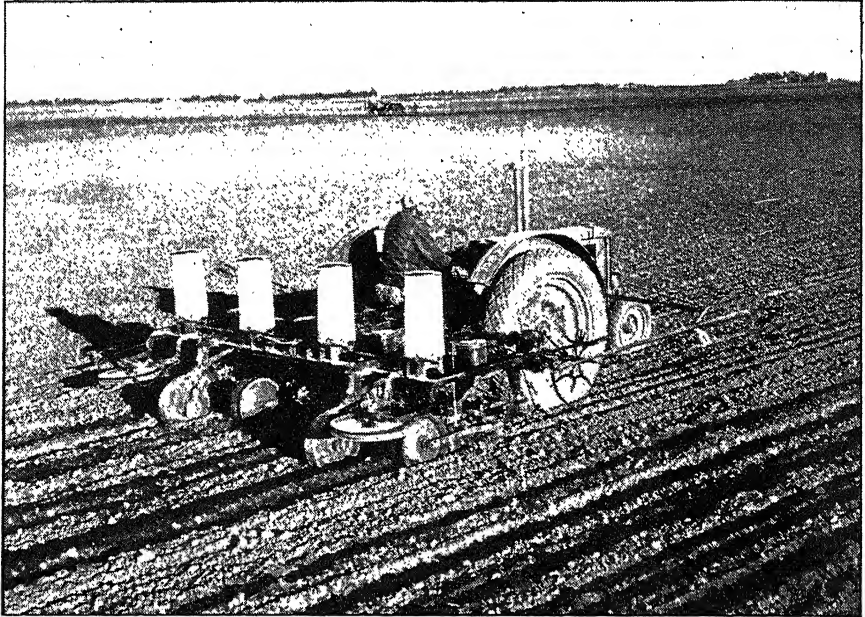


Photo by James Sawders

Planting corn four rows at a time in Indiana. Before machines were invented, the seed corn was dropped in the furrows by hand.

tivity of our lives today. Foods of all kinds are grown, harvested, prepared, packed, and transported by some form of machinery. Textiles, clothing, shoes, and hats are almost entirely machine made. Building materials go through various machine processes; and machines play a large part even in the erection of large structures. Transportation as we know it is entirely a machine activity. From the first small, clumsy locomotives to our present streamlined trains, buses, and airplanes there has been a marvelous growth in the power and efficiency of engines and operating machinery. The same thing is true of the telephone, telegraph, and radio, all of which depend upon machines for their success. The X-ray in surgery, the motion picture in entertainment, the electric refrigerator, the washing machine, and the vacuum cleaner in household service are examples of machines which have greatly affected our manner of living and have made the machine age very different from the old days of hand labor.

How machines have affected farm life. Machinery has greatly lessened the labor of farming. Formerly long hours of constant and backbreaking toil were necessary to plant, cultivate, and harvest crops. Now the farmer has machines to do all these things faster and easier than he could do them by hand or even with animal power.

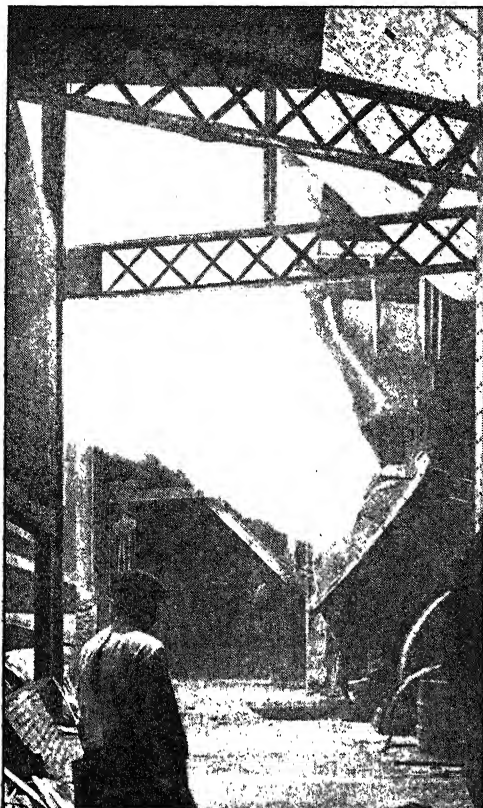
The clothing, shoes, tools, and implements which used to be made on the farm are now bought either in the village store or from a mail-order house by means of an illustrated catalogue. They are all products of the mill and factory.

Thousands of farm homes now have electricity for the operation of household appliances, telephones to keep them in touch with the world outside, and radios to provide news and entertainment. Automobiles are common on farms today, and many farm families are able to see the latest motion pictures every week by going to the nearest town. Farm life is indeed different in the machine age. The farm boy is no longer a "hick" or a "hayseed." He is more apt to be a college graduate, an engineer, or a skilled mechanic. Farm women today have more leisure for self-improvement by reading and social intercourse, and they are as up-to-date as their city sisters.

The more machines, the more work. Machine production has shortened working hours and increased leisure time not only on farms but in cities and towns as well. The result of this increased leisure has been to create a demand for recreational and educational products. Automobiles, radios, books, magazines, motion pictures, athletic supplies, and other products have all benefited from this increased demand. This has given employment to thousands of workers in these industries.

The increased output of all kinds of machine products has greatly reduced the cost of these articles. This in turn causes greatly increased sales, making business better. This *mass production*, as it is called, is well illustrated in the automobile industry. Efficient manufacturing methods and large sales have brought the prices of cars down to a level that makes average family ownership possible.

Although business conditions sometimes have become poor, the people of the United States have amassed more wealth than those of any other nation. Our great buying power is shown by the following facts: With less than seven per cent of the world's population, the United States before World War II consumed in an average year more than three fifths of the world's rubber; more than one fifth of the world's sugar; nearly three fourths of the world's silk; more than one third of the world's coal; more than two fifths of the world's pig iron; and about three fourths of the world's petroleum. Most of these products entered into our many manufacturing industries; coal and petroleum are our great sources of power. Not only our own people, but those of other countries, benefit from our machine production. All over the world American-made articles and American-



Courtesy Bethlehem Steel Co.

A Bessemer converter in operation. In this converter nearly all the carbon is removed from the cast iron. Strong blasts of air are made to pass through the molten iron to burn out the carbon.

made machines have brought modern conveniences within the reach of millions of people, and their sale gave employment to great numbers of workers in many lands.

What we owe to inventors. The world owes a great debt of gratitude to the men who have invented various types of machines and developed the resources of power and raw materials upon which our industrial progress has depended. Hargreaves and Cartwright in England invented spinning and weaving machinery which revolutionized the textile industries. Slater brought the plans for these machines to America and successfully set up similar mills here. Whitney invented the cotton gin and thereby made cotton fiber much cheaper to produce, thus

changing cotton goods from a luxury for the rich to the cloth of the people. Watt made the steam engine practical and gave us our first all-purpose power. Kelly and Bessemer gave us the modern process of converting pig iron into steel and inaugurated a vast industry. Edison was truly the electrical wizard, and many of his inventions are essential for our manner of living today. Ford and others made the automobile practical and reasonable in price. These are but a few of the men whose inventive genius has profoundly affected the industrial and domestic life of the world.

FACTORS ESSENTIAL TO SUCCESSFUL MANUFACTURING

Use of power. Without power modern manufacturing would be impossible. Machines must be kept moving. The principal sources

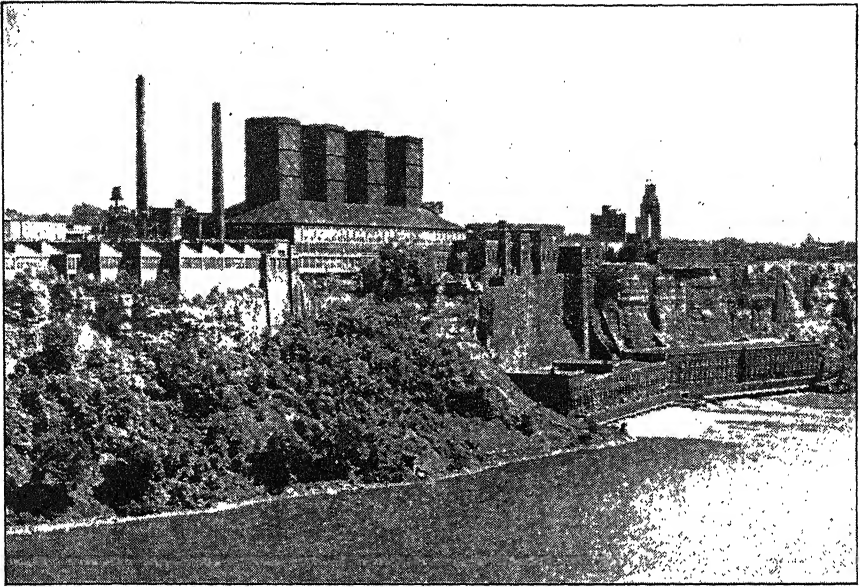


Photo by James Sawders

A power plant on the American side of Niagara River just below the Falls. Note the force with which the water leaves the power plant.

of power are running water, coal and petroleum. Water power is sometimes used to operate machinery directly; but nowadays it is usually used to produce electric power. Coal and petroleum are used to make steam, which runs machines directly; but they are also used to generate electricity. Gasoline, made from petroleum, also operates machinery and produces electricity. Thus our manufacturers utilize water power, steam, and electricity. For all these we have abundant resources; and our great industries have grown up near these sources of power. Other countries are also well supplied with power resources. Great Britain has a vast supply of coal, as has Germany. Japan needs more coal, which may be one reason for its interest in the great mineral fields of eastern Asia. The United States, however, leads the world in the production of coal and petroleum, which gives us a great advantage in manufacturing.

Adequate raw materials. Those substances which are used in making a manufactured article, such as cotton, wool, silk, rubber, wood, iron, copper, hides, and many other products of soil, forest, ranch, and mine are called *raw materials*. If the raw materials are near at hand, it is a great advantage. Thus the cotton mills of the South are close to the supply of raw cotton; the steel mills of the Middle West are near the Lake Superior iron mines; and the paper

mills of New England have pulpwood forests near by. In Great Britain iron mines and coal fields are near the great steel-making cities; and in France silk was produced close to the silk mills.

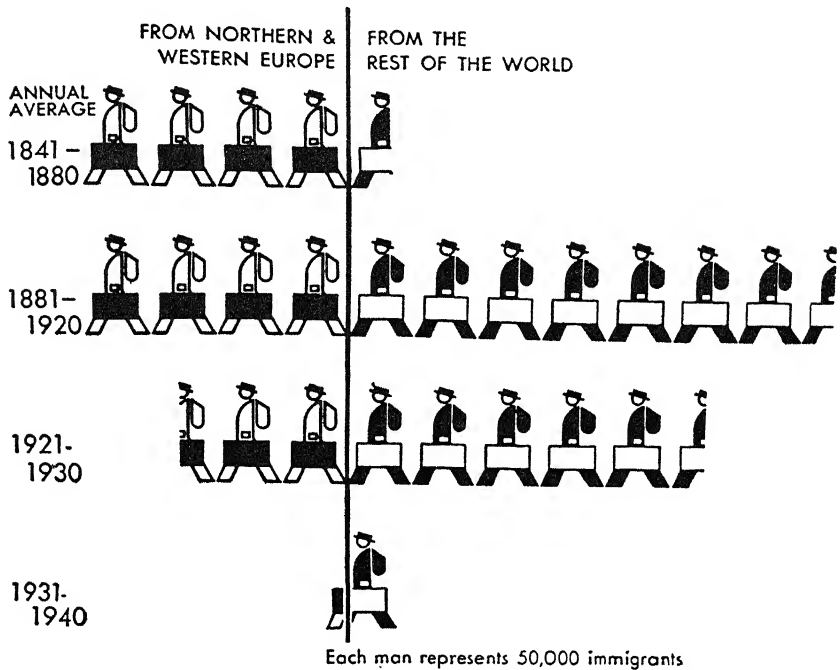
But it is not necessary to locate mills and factories near the source of raw materials. Railroads and steamship lines can carry the raw materials from all parts of the world to manufacturing plants in many countries. Of course this long-distance transportation of raw materials adds to the cost of manufactured products; but in many cases it is unavoidable. For example, before World War II our automobile industry needed rubber for the making of tires. The tire factories are located mainly in and around Akron, Ohio; only a little raw rubber is produced in the United States. The rubber was brought in from the East Indies, the Philippines, and South America. The same thing is true of our woolen and leather industries, for we do not produce enough wool or hides to supply our mills and tanneries. Likewise we exported great quantities of cotton to supply mills in other countries. Manufacturing industries must have raw materials.

Need for markets. A manufactured article is useless unless it can be sold. There must be a market. This problem of markets is a difficult one for the manufacturer. Styles change, and manufacturers cannot afford to keep on making old-style goods because nobody will buy them. If too large a supply of any article is produced, there will be an unsold surplus, and the manufacturers will lose the money they have put into the making of these goods. A sudden or increased demand may cause a shortage of some goods, and manufacturers lose profits which they otherwise might gain. This is called *the law of supply and demand*, and businessmen watch it closely.

The demand may be entirely *domestic*, that is, confined to the country where the goods are produced; or it may be *foreign*, that is, the goods are sold in foreign countries. In the United States we have a very large domestic market for our manufactures; but we have also gained great profits from our foreign markets. During recent years this foreign demand for our goods has almost entirely ceased except for lend-lease supplies which have been sent out in great quantities. The foreign demand for American products was due partly to the quality, attractiveness, and reasonable prices of our goods. Our farm, mine, and factory machines, our automobiles, our shoes, our textiles, and our prepared foods found ready markets in nearly all parts of the world.

Effect of climate on manufacturing. Climate has a great deal to do with manufacturing. All the great industrial countries are in

IMMIGRATION TO THE U. S.



Pictograph Corporation

Here is shown the number of immigrants who came to the United States in the last hundred years. It also shows what proportion of our immigrants have come from northern and western Europe.

temperate regions. In tropical countries the hot climate makes working conditions difficult in mills and factories. (The owners of textile mills in our Southern States have introduced air conditioning to keep their mills cool.) It is difficult to find skilled workers in hot areas, and men from temperate regions do not wish to live in the uncomfortable climate of the tropics. The spinning and weaving of cotton and linen require considerable moisture in the air for the best results. But the amount of moisture must be controllable.

Tropical and subtropical countries produce many raw materials which are sent to temperate regions for manufacture. Cotton and rubber are two good examples of such raw materials. Can you name any others? In return for raw materials temperate countries send many manufactured products to the tropics. All hot countries import cotton goods for clothing. All kinds of machinery and equipment for mining, transportation, farming, and business are also imported by tropical countries. Many of the resources of these hot regions are being developed by the businessmen of temperate coun-

tries so that they may have a constant and plentiful supply of raw materials and a good market for their own products.

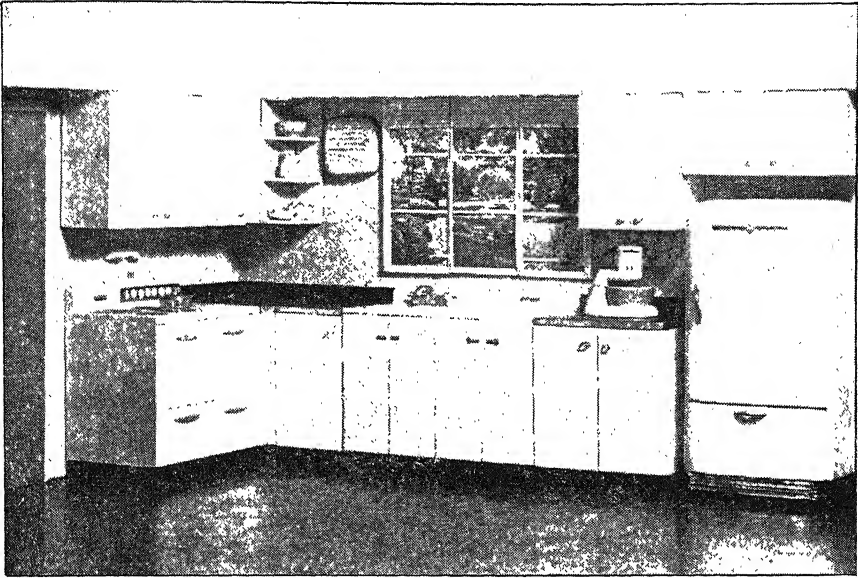
Labor and capital. All industries must have workers, or *labor*. They must also have money to buy raw materials and to pay for the labor used. This money invested in industry is called *capital*. Labor demands and should receive wages sufficient to enable men and their families to live decently. Our American industries pay higher wages to labor than any other country in the world. When our population was smaller and our industries were growing rapidly, it was sometimes hard to find enough labor. On account of the high wages offered, millions of workers came to the United States from foreign countries during the half century from 1851 to 1900. Without these European laborers our great industries could not have grown as they did. Now, however, there is little immigration; but the wages paid to our workers remain the highest in the world.

People invest their money, or capital, in an industry in order to make a profit. This profit depends upon a great many factors, such as the cost of raw materials and labor, the prices obtained for the product, tariffs, and other forms of taxation. When business becomes unprofitable, we have idle factories and much unemployment.

Many countries lack the money to finance their own industries, and in such cases foreign capital is often sent in to operate mines, railroads, and factories. In the early days of our own country British capitalists had large investments in the United States, as they still have in Canada and other parts of the world. Americans have invested many millions of dollars in the mines and industries of Canada. In South America and Mexico both the United States and Great Britain have made large investments, particularly in oil and minerals. Now many British investments in foreign lands have been liquidated to pay the costs of the war. The profitableness and safety of foreign investments depend upon the stability and honesty of the governments in the countries where the industries are located. Unfortunately some governments occasionally do not allow foreign companies to operate successfully. This often results in a loss both to the companies and to the countries involved.

THE POWER THAT RUNS THE MACHINE

How power is used in the home. Man took a long step forward when he invented machines and harnessed the great forces of nature—wind, water, and steam—to run them. It would be utterly impos-



Courtesy General Electric Company

Electricity in the home lightens woman's work.

sible today to produce all the goods that we need without the use of power-driven machines. Power touches our lives at every point. Only a half century ago all housework was done by hand, that is, by human muscles. In those days very little power was used in homes, but factories were already well supplied. Now, since we have learned how to use electric currents, millions of homes have been supplied with power. Electricity lights our rooms, cooks our food, and runs our washing machines, vacuum cleaners, sewing machines, and pumps. It toasts our bread, heats our flatirons, rings our doorbells, operates our oil-burning furnaces, and makes possible the radio, the telephone, the telegraph, and artificial refrigeration. The influence of refrigeration on human life can hardly be exaggerated. Housework today is far easier and pleasanter than it was fifty years ago.

How power is used in the community. Outside the home the work of electricity is even more amazing and complex. It lights our streets, buildings, and signs; runs streetcars; operates trains; drives industrial machinery; and furnishes the spark that makes the gasoline engine run. It lifts elevators, hoists cargoes, operates mines, smelts ores, and extracts nitrogen from the air, thus giving us an abundant supply of nitrates for fertilizers. It operates searchlights and signals of all kinds, adding greatly to the safety of travel by sea, air, and land.

Electric light and power have come into use in comparatively recent times. Many people now living depended in former years upon horsecars and horse-drawn carriages for local transportation. Their streets and homes were lighted with gas or kerosene lamps, and there was none of the many electrical devices so common today. This is indeed the *age of electricity*.

Sources of power. The great sources of power are the movement of air, the falling of water, the expansion of steam, and the explosion of gas or oil. Electricity in itself is not a primary power. It must be generated by water power or by steam or gas engines. Electricity, however, has a great advantage over other kinds of power because it can be transmitted for long distances over wires and because it has so many uses. The windmill and the water wheel operated our first simple machinery. Later steam engines came into use; and still later the gasoline and oil engine. Electric power has now become our most important driving force. No one can predict how much more useful it will be in the future.

GUIDES TO STUDY

1. What articles made by old-fashioned hand methods may be seen in your homes, in your vicinity, or in museums?
2. Why in colonial days was so much of the work done by hand?
3. What great advantages are there in the use of machines?
4. What were some of the earliest machines?
5. List the different kinds of work done by machines.
6. How has the use of machines changed our ways of living? Name countries in which machines are little used. Explain why.
7. How do machines help the housewife? The farmer? The miner? The lumberman? How have machines led to specialization?
8. How has the use of machinery increased the wealth of the United States? What effects have machines had on our standards of living? Why?
9. What are the sources of power used to operate machines? Which has been used longer than the others?
10. What conditions are favorable to successful manufacturing? In what ways is manufacturing related to climate?
11. To what places may a factory turn for its raw materials? Why?
12. How important is a market to a manufacturing industry?
13. Why are many goods exported to foreign lands? Why are many goods imported?
14. How does climate influence manufacturing? How does climate lead to exchange of products?
15. Show that manufacturing depends on capital.
16. How important is skilled labor? Give illustrations.
17. Why are many pages of our newspapers filled with advertisements calling for skilled labor?

18. What kinds of labor are in great demand just now?
19. Why do the capitalists of one country invest their money in a foreign country? Give an illustration.
20. List the many uses of the electric current. Name at least a dozen uses in the home.

TOPICS FOR CLASS DISCUSSION

1. Machines and unemployment.
2. Great inventors.
3. Skilled labor and unskilled labor.
4. Effect of machines on prices.
5. The locations of manufacturing plants.
6. Power as related to a country's wealth. To its strength in time of war. Why so much oil is needed for the prosecution of the war.

WORK TO BE DONE

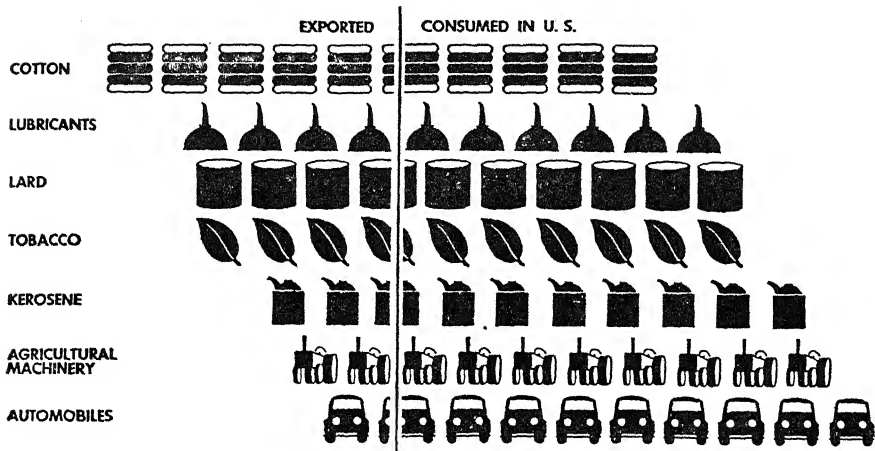
1. On a map of the world locate the chief industrial countries. Try to account for the importance of each on the basis of access to power, raw materials, and markets. Is the character of the people themselves a factor? Are there countries possessing coal, raw materials, and potential markets which are not industrial countries? China, for instance. Name others and give reasons.

5. TRADING—A UNIVERSAL INDUSTRY

Why countries trade. Backward nations have little trade with other lands. Their wants are few and their buying power is small. Wants and needs increase with civilization. Progressive peoples are not satisfied only with that which they themselves can produce. Moreover, what were once luxuries have become necessities, and the desire for luxuries becomes ever greater.

Fruits of other lands, beverages, finer clothing than that made at home, raw materials for home factories—all these and many others must be imported. Imported goods must be paid for with exports or in some other way, and markets must be found for surplus products. The exchange of goods between countries or between different parts of the same country is called *commerce*. Human needs have become so great and modern life so complex that commerce is absolutely necessary if the industrial life of a people is to go on. Commerce is made necessary by differences in climate, by differences in the natural resources of countries, and by differences in the people themselves. In this section we shall study some of the reasons why goods are sent from one part of the world to another.

WE GAIN BY SELLING BEYOND OUR BORDERS



Each symbol represents 10 percent of production

Pictograph Corporation from U. S. Maritime Commission

What do we gain by selling beyond our borders? How do we pay for goods purchased from other countries?

Differences in climate. People in northern United States and Canada cannot grow their own oranges, bananas, coffee, cocoa, rubber, and many other tropical or subtropical products. On the other hand people in hot lands as a rule do little manufacturing. Their manufactured goods are obtained from cool regions where people can work all day in mills and factories without too great discomfort.

Cattle and sheep are often raised in semiarid lands, where cultivation of the soil would not be profitable. The animals or the animal products are then sold to more densely settled regions where farming or manufacturing is carried on.

Before the days of mechanical refrigeration ice frozen on the lakes and rivers of northern United States was transported in slow sailing vessels as far as Calcutta. Thus we see that differences in climate make necessary the exchange of goods of many kinds.

Resources—many or few. Countries differ in the kind and extent of their resources. Australia and New Zealand have abundant grasslands and therefore used to ship to other lands great quantities of meat, wool, butter, and cheese. Great Britain has rich deposits of coal which it formerly used in manufacturing wool from Australia and cotton from the United States. Thus Great Britain had a surplus of textiles and other manufactured goods which it exported to Australia, New Zealand, and many other countries. The Andean countries of South America are rich in copper, tin, and nitrates. Other

countries lacking those minerals look to the Andean countries for a part at least of their supply.

Resources—used or unused. If a country makes use of its resources, it will have a surplus to send abroad. Argentina makes use of its grassy plains and exported meats, wool, and hides; Belgium formerly made use of its coal as a fuel for factories and produced a surplus of manufactured goods. For years Brazil has been known to have huge deposits of iron ore but only recently have they begun to be developed. As a result more railroads will be built and manufacturing will be developed. The great forests, mineral deposits, and agricultural lands of the United States were almost untouched until Europeans came to this country and until people learned to use machines. Thus we see that countries which have learned to develop their resources will have the products of their industries to sell while undeveloped countries will sell mainly products in their natural state.

Advantages of location. The commerce of a country is greatly favored if other countries can easily be reached. Great Britain has a very favorable location. Just across the English Channel lie Germany, the Netherlands, Belgium, and France—all industrial countries having many goods to sell in peacetime and needing many articles which they cannot provide for themselves. Australia and New Zealand on the other hand sent the products of their farms and ranches halfway around the world to find a good market. Accessibility to other commercial regions is not only a great help to a country's foreign trade but almost a necessity.

Tariff walls. A tariff is money paid to the government of a country on goods imported from foreign countries or exported to foreign countries. The tariffs of our country are levied only on goods imported. Tariffs are placed on imports for two reasons: one to provide the Government with revenue to meet expenses, and the other to increase the price of the imported article. If the price of an import is increased by tariff, then it is easier for an American producer of a similar article to compete with it.

As a result of tariff walls each nation finds it more and more difficult to market goods abroad. It is often the case that, in order to sell goods in a foreign land, a country must agree to buy a certain quantity of goods from the purchasing nation. No nation, however, can be wholly independent or self-sufficient. Differences in climate, in resources, and in the people themselves make it necessary that foreign trade be carried on.

The benefits of foreign trade. Trade with other countries



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enables a country to make the best use of its resources. It can exchange a surplus of one commodity for products which it lacks. It can sell the particular skill of its own workers for that of another country. Great Britain can not support its large population without foreign trade. That country must sell the labor of its people in exchange for food and raw materials. France sold the skill and fine taste of French workmanship to people who appreciated fine things and who were unable to produce goods of equal quality.

Foreign trade also makes for progress. Exchange of goods is accompanied by an exchange of ideas. Without such interchange of ideas the progress of the past could not have taken place. Exchange of goods and ideas helps nations to know one another better and should lead to more friendly relations. The world of today needs nothing more than peace and goodwill among the nations.

GUIDES TO STUDY

1. Why do backward countries do little trading?
2. What products must the United States import? Give the reason in each case.
3. Why do differences in climate lead to exchange of goods? Give illustrations.
4. Show that exchange of goods may be due to differences in natural resources.
5. Why do some countries import articles which they could produce at home?
6. How does the location of a country help or hinder its foreign commerce? Give illustrations.
7. How may tariffs hinder trade between countries?
8. How does foreign trade benefit a country?

9. How do progressive nations tend to become self-sufficient?
10. Name the leading commercial countries of the world. What have been the chief imports and exports of each?

TOPICS FOR CLASS DISCUSSION

1. The United States could get along without foreign trade.
2. Which is more important to a country—resources or a progressive people? Cite illustrations.
3. A country would be better off without any tariff on imported goods.
4. Foreign trade and a country's progress.

WORK TO BE DONE

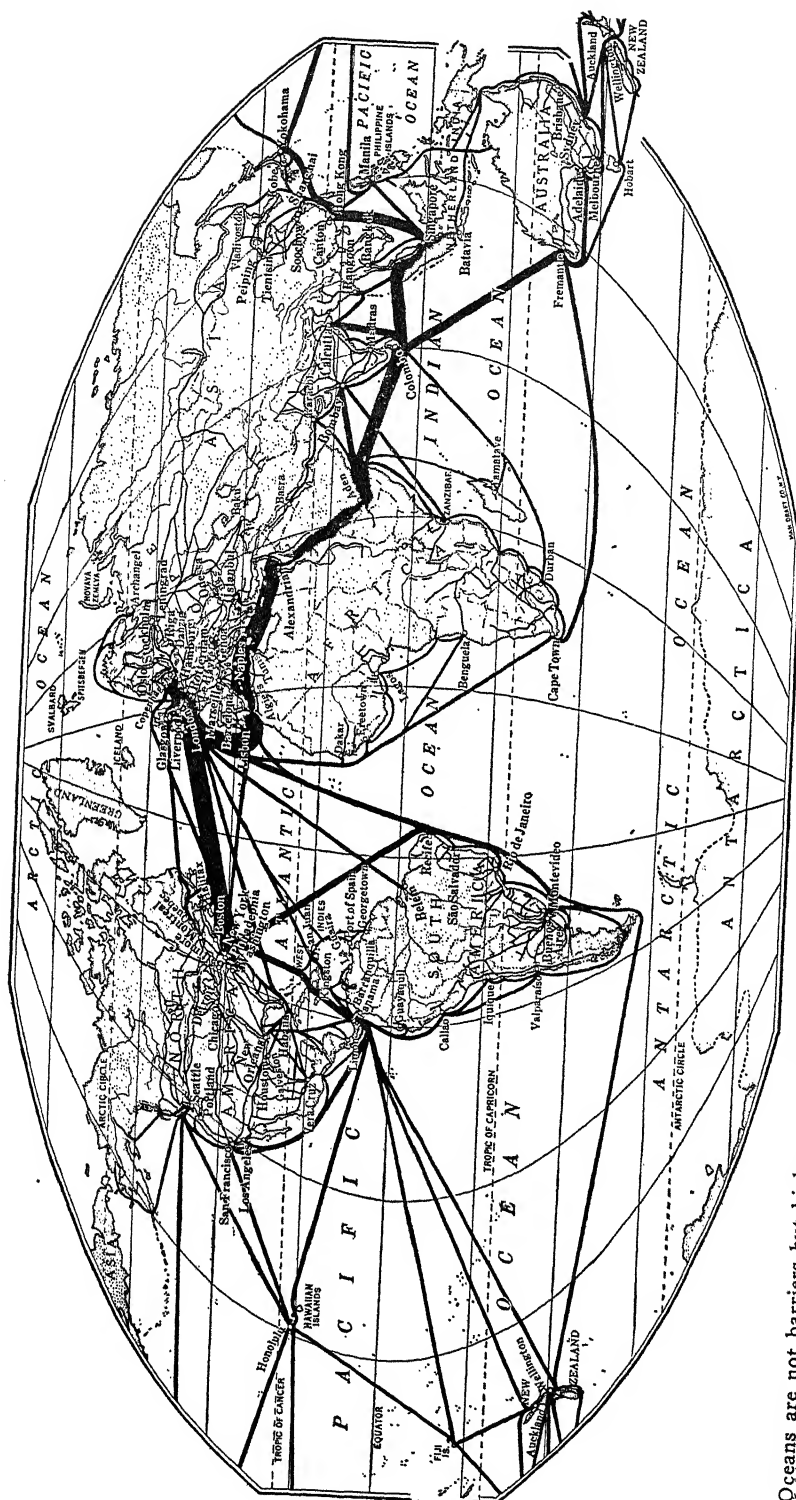
1. Make a list of imported goods which we cannot produce in this country; a list of imported products which we could produce ourselves; a list of imported goods which we could do without.
2. Make a list of five or more of the leading products of our farms, forests, mines, and factories. Try to find some relationship between these products and our foreign trade.

6. TRANSPORTATION

WORLD TRADE ROUTES BY SEA

World sea lanes. The great routes of trade connect the leading commercial countries of the world (see map p. 106). One of the busiest lanes connects western Europe and the United States. Other Atlantic routes run south from the United States and Europe to eastern South America and the Caribbean. Another important route runs from western Europe through the Mediterranean and the Suez Canal to India, southeastern Asia, and Australia. Across the broad Pacific other lanes of trade form crossroads at the Hawaiian Islands and skirt the coasts of North America and Asia. Still others radiate from the Panama Canal in all directions. As we study these world routes, we shall be able to mention only a few of the more important products formerly carried over each highway.

Trade of the North Atlantic. Great Britain led all other countries in the value of its foreign trade. Then followed in order the United States, Germany, and France. Following Japan came Canada, Belgium, and the Netherlands. Thus we see that seven of the eight leading commercial countries lie on opposite sides of the North Atlantic Ocean. Great quantities of foods, raw materials, and manufactured articles of all kinds were constantly moving in both direc-



Oceans are not barriers but highways. The width of the bands, representing normal trade lanes, is proportioned to the value of the commerce that was carried before the outbreak of World War II.

tions along this, the world's greatest ocean highway. Ships of every maritime nation were engaged in the carrying trade.

The United States exported to European countries raw cotton, petroleum and its products, automobiles and parts, lumber, and a great variety of other products. Ships from Canada, as before the war, take to European countries, especially to the mother country, grains, meats, dairy products, lumber, and minerals, all of which are urgently needed, especially in the industrial countries.

Returning westward across the Atlantic the cargoes moving to Canada and the United States consisted of fine cottons, woolens, and linen goods, products of the age-old industries of England, Ireland, France, and Belgium. From England also came tea from India and tin and rubber from Singapore. Germany besides iron and steel and wood pulp sent potash, dyes, and other chemicals, the products of its scientific laboratories. France sent westward fine silks and rayon, the latest creations in styles of clothing, furs, perfumes, and jewelry. Mediterranean Europe helped load the westwardbound ships with wines, olive oil, olives and other fruits, silk and rayon, and the handiwork of artistic French and Italian workmen.

Southern highways of the Atlantic. The Atlantic routes just studied run east and west. Other and less important lanes of the Atlantic run in north-south directions. These routes connect European countries and the United States and Canada with the countries of eastern South America, the Caribbean countries, and the Panama Canal.

Northward over these ocean paths pass ships laden with meats, wool, and hides from the ranches of Argentina and Uruguay. The densely settled industrial countries of Europe, especially Great Britain, need the meats and the wheat from Argentina. The tanneries of the United States demand large numbers of hides and skins together with quebracho from Argentine forests to help tan them. Brazil contributes coffee and some rubber and cocoa for northern markets. Back the ships used to go laden with iron and steel and textiles from Europe, and with petroleum, lubricating oils, automobiles, trucks, and farm machinery from the United States.

Today the movement of all products is hampered by the attempt of the Allies to prevent goods from leaving enemy territory. The movement of Allied shipping is constantly menaced by Axis submarines.

Caribbean lands and Mexico are rich in minerals and tropical products. European and American capital draws oil from the wells

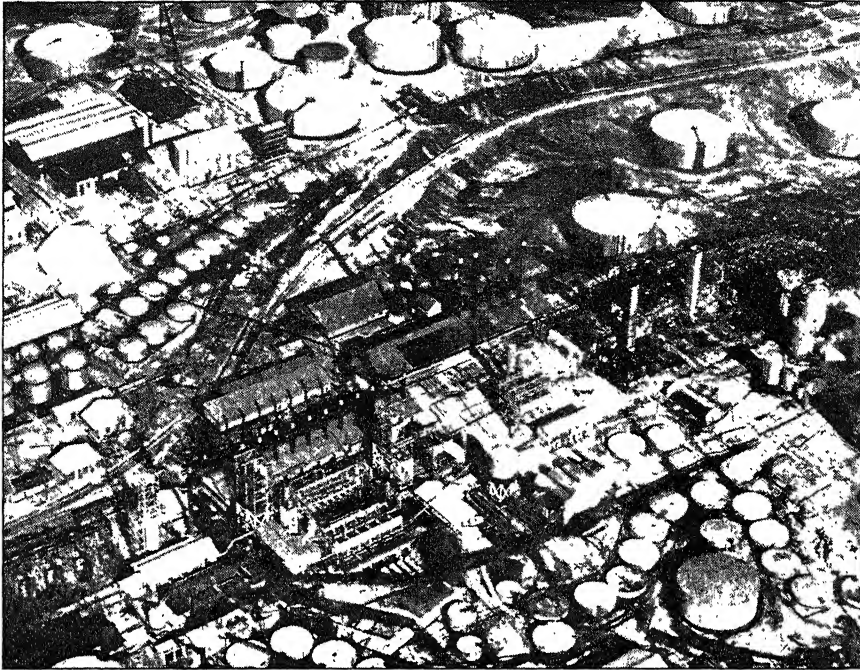
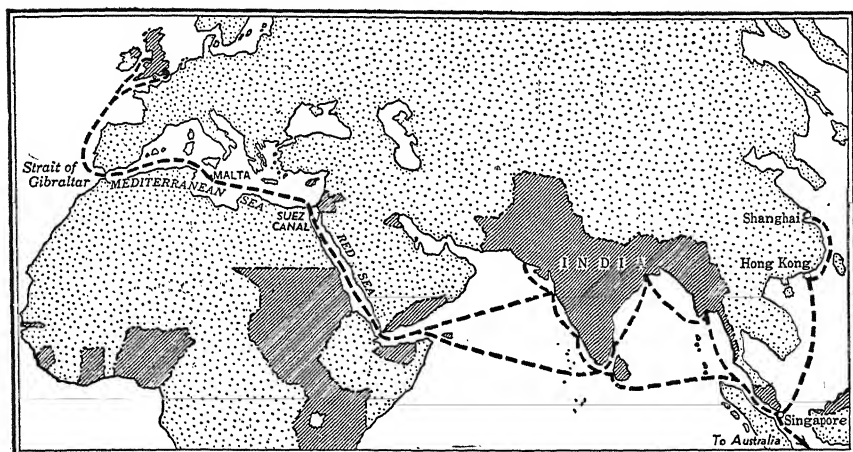


Photo from Free-Lance Photographers Guild

A large oil refinery south of Tampico, Mexico. The oil fields of Mexico were developed mainly by British and American capitalists, but in recent years control of the industry has been taken over by the Mexican government.

of Venezuela and Colombia and mines bauxite in the Guianas and gold, silver, and copper in Mexico and Central America. Plantations also largely financed and managed by Americans ship northward sugar from Cuba and bananas from Colombia, Central America, and the West Indies. Southward to the Caribbean move the textiles and other manufactures of northern countries.

East to the Indies. Through the Mediterranean Sea and the Suez Canal is another route over which a large part of the world's commerce moved. This water route was used mainly by the countries of Europe in their trade with southern and eastern Asia, Japan, the East Indies, Australia, and New Zealand. The route to the East is of special value to Great Britain since it offers a direct route to some of its most valuable colonies. A few of the products moving west were the textiles of Japan, the tea and jute of India, and the rubber and tin of the Malay Peninsula and the East Indies. Australia and New Zealand sent their wool, mutton, and dairy products. These regions of the East were excellent markets for manufactured goods. India was Britain's best market for cotton goods. Iron and steel and



The British "life line," route to India and southeastern Asia. Note the strategic islands and coasts belonging to Britain at intervals along the route.

machinery were purchased in large quantities for the mills and factories of India, China, and Japan.

Around the Cape of Good Hope. Not all the European ships pass through the Mediterranean and the Red Sea. The first all-water route was established by Da Gama when he discovered the route around the Cape of Good Hope. Ships using this route avoid the payment of canal tolls at Suez. Some of them trade with ports all along the coast of Africa and then continue to India or Australia. The ports of West Africa formerly shipped palm oil, cocoa, and mahogany; South Africa furnished gold, diamonds, wool, and fruits; East Africa supplied cotton, coffee, sisal, and cloves. All these ports have imported a great variety of manufactured goods from European countries and the United States.

The Suez Canal—"the ditch in the desert." The route around the southern point of Africa was the only water route to the East until 1869 when the Suez Canal was opened. It is at sea level and more than one hundred miles in length. Although it is operated by the British, the greater part of the stock is owned by the French. It is a vital part of Great Britain's route to India. The tonnage passing through it in normal times is a little more than that of the Panama Canal.

The closing of the Mediterranean and the Suez compelled the United Nations to send their ships around Africa. This detour requires about four times as many ships to carry the same quantity of goods as it would by the Suez route. The opening again of this route by the United Nations' success in North Africa and the Medi-

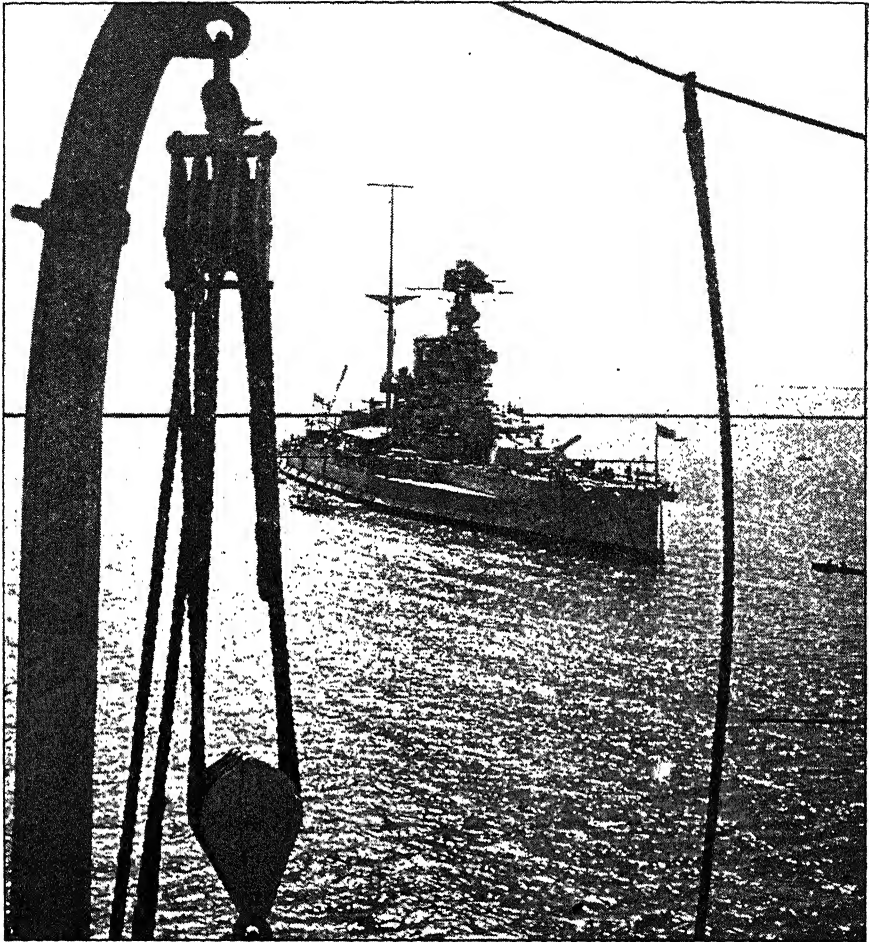


Photo by Fritz Henle from Black Star

An English battleship guarding the Suez Canal

terrestrial is the equivalent of adding thousands of tons of shipping to their fleets.

Routes of the Pacific—the Panama Canal. The traffic lanes of the Pacific are joined to those of the Atlantic by the Panama Canal. The United States obtained rights to construct the canal from the French who had attempted to build it but were unable to complete the work. A treaty was also made with the government of Panama whereby that government granted in perpetuity the use of the Canal Zone, a strip five miles wide on each side of the canal route and extending across the isthmus.

The canal was constructed primarily to connect the eastern and western coasts of the United States. It is of course of great service

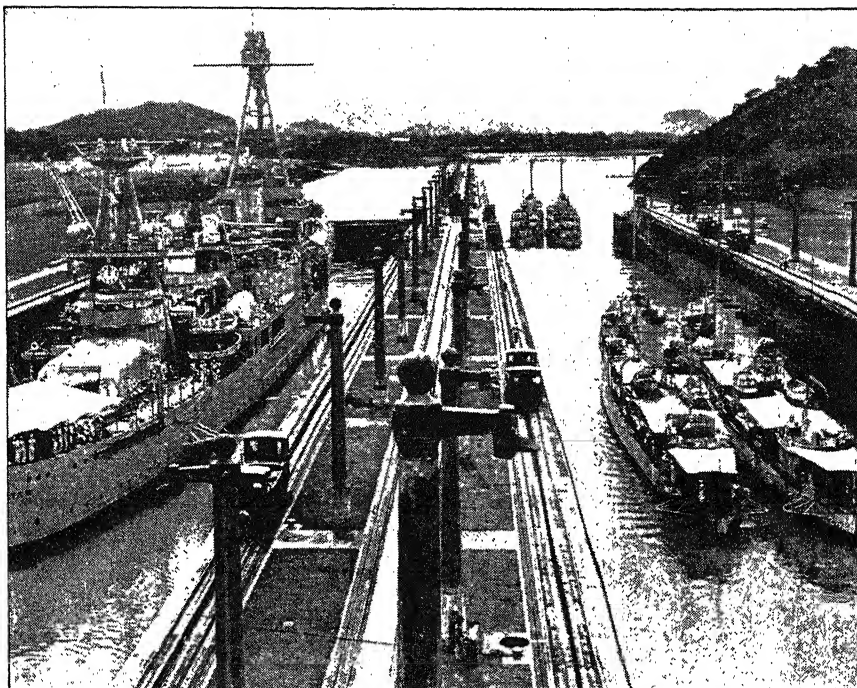


Photo from Keystone View Co.

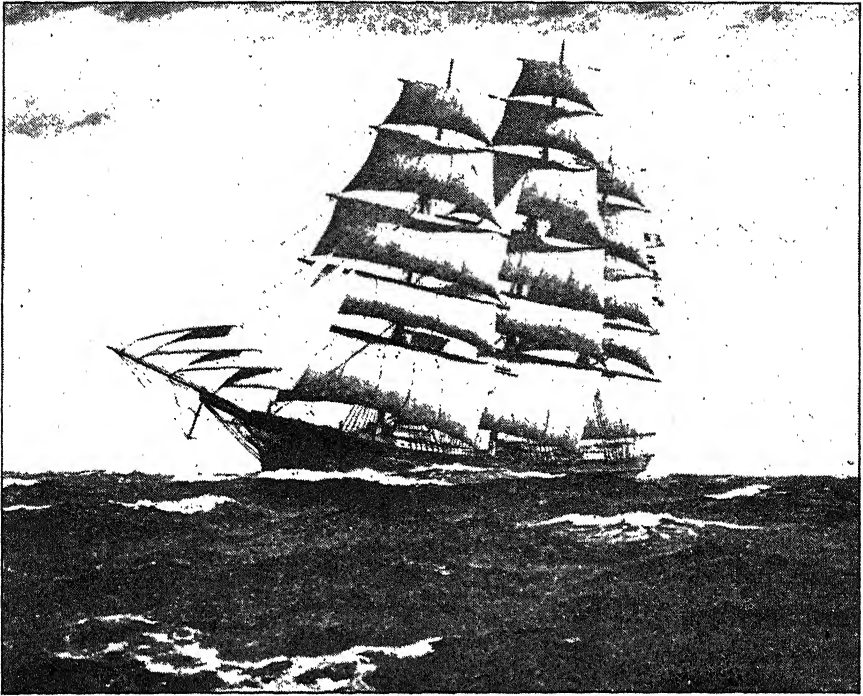
Locks of the Panama Canal. On the left a United States cruiser is waiting to pass through the locks. The canal saves thousands of miles on each trip for ships sailing from one coast of the Americas to the other.

to the countries of western South America, to western Europe, and to countries bordering the Pacific Ocean on the west. The canal shortens the sea route from New York to San Francisco about 8000 miles and the sea route from New Orleans to San Francisco about 9000 miles.

The principal products passing through the canal from west to east are grains, gasoline, sugar, lumber, and fruits. Moving in the opposite direction are products of iron and steel, a variety of manufactures, and cotton. The volume of goods moving east is about three times as great as that moving west.

The United States has obtained rights to construct another canal connecting the Atlantic and the Pacific through the country of Nicaragua. This route if constructed will be through Lake Nicaragua and the San Juan River. The plan will be carried through if the Panama Canal proves inadequate to handle the interocean traffic. The distance between east and west ports of the United States would be shortened by several hundred miles.

West to the Orient. Across the Pacific, before Pearl Harbor,



*From a painting by Charles Robert Patterson,
courtesy Merritt, Chapman, & Scott Corp.*

"Glory of the Seas," one of the famous ships that carried American cargoes in the heyday of the clipper ship era

the richest cargoes passed between the United States on the east and China and Japan on the west. Japan was our best customer for raw cotton and we were that country's best customer for silk. Formerly the silk was landed at Seattle, Vancouver, and San Francisco and taken by fast trains known as "silk specials" to New York. Later silk came by ship through the Panama Canal. The competition of rayon was partly responsible.

From the Orient also came tung oil and tea from China and soybean oil and pottery from Japan. To the countries of the Orient besides raw cotton we sent lumber, gasoline, kerosene, and much iron and steel. Ships on their way east called at the Hawaiian Islands and added to their loads sugar and canned pineapple. These ships also accommodated many tourists who visited Hawaii, Japan, and other countries of the Far East or who were on their way around the world. Ships taking the southwesterly route from the United States to Australia and New Zealand carried farm machinery and tractors for the farms of those countries besides gasoline and lubricating oil. On the return trip besides wool they brought rabbit skins which were dressed

and made into fur coats that sell under the trade name of *lapin*, the French word for rabbit.

Around the Horn. Before the opening of the Panama Canal in 1914 ships could make the complete voyage from the Atlantic to the Pacific only by going around Cape Horn. The winds in the vicinity of the cape are very strong westerlies, known as the *roaring forties*. Owing to the violent winds and the narrow straits this part of the trip was dreaded. Ships sailing eastward from Australia and New Zealand as well as those sailing from the southern ports of western South America avoided the cost of tolls and added but little to the length of the voyage by sailing around the Horn.

A fleet of sailing ships, known as the *grain clippers*, for years vied with one another to carry the Australian wheat crop to England in the shortest time. On the outgoing journey they sailed south over the Atlantic to the Cape of Good Hope, then east to Australia where the ships were loaded with wheat. They again sailed east around Cape Horn to the Atlantic, then north to the British Isles, thus completing the journey around the world. Sailing as they did in an easterly direction in the southern hemisphere, the ships had the benefit of strong westerly winds of the southern latitudes. The grain clippers made this trip around the earth each year when the Australian wheat was ready for shipment. The whole world watched to see which ship made the homeward voyage in the shortest time.

GUIDES TO STUDY

1. Why is one of the busiest sea lanes between Europe and the United States?
2. Why is the Suez Canal route a very busy one?
3. What goods move in normal times from the United States and Canada to Europe? Why?
4. What types of goods move west to the United States? Why?
5. What products pass from South American countries to Europe? Account for this trade.
6. What goods move from Europe to South American countries? Why?
7. What countries are benefited by the Suez Canal? What products go to market in each direction? Give reasons for this trade.
8. Why do some ships sail around the Cape of Good Hope? What contributions are made to this trade by the countries of Africa? What do they receive in return? What routes were followed by the world's earliest traders? Who were these traders?
9. What country owns the greatest number of shares in the Suez Canal?
10. How did the closing of the Suez Canal by the Axis hamper the Allies?

What great advantages result from the later opening of the Mediterranean-Suez route?

11. What countries are benefited most by the Panama Canal? Give reasons in each case.

12. What products pass through the Panama Canal in each direction? As best you can, give the probable source and destination of each product. Has the Panama Canal been a profitable investment for the United States Government? Why?

13. Describe fully our former trade with the Orient. Give as fully as you can the reasons for the trade between the two regions. Include specific natural resources, cost of labor, etc.

14. Why do ships make the long voyage around Cape Horn? Is Chile benefited by the Panama Canal as much as Colombia?

15. Describe the route of the grain clippers. What were the advantages of this route?

16. What countries had large merchant fleets before the war? What countries depended largely on the ships of other countries?

TOPICS FOR CLASS DISCUSSION

1. The leading commercial countries of the world.
2. The great trade routes of the world. Why waterways have been the most important routes.
3. The leading products in world trade.
4. The great canals of the world. The building of these canals.
5. How tunnels shorten routes. Name and locate a few well-known tunnels.
6. The future trade of the Far East.

WORK TO BE DONE

1. On an outline map of the world trace the great trade routes of the world. Indicate some of the leading products passing over each route and show by arrows directions in which they move.
2. On your outline map trace the routes followed by the grain clippers.
3. Appoint committees to study and report to class one or more of the topics suggested under "Topics for Class Discussion."
4. Take a vote of the class to decide which of the topics of this section are most interesting and arrange for further studies, reports, and discussions of those topics.

WORLD AIR LINES

Man flies. So common has the airplane become that in normal times we scarcely lift our eyes when we hear one droning overhead. It couldn't be done, but it has happened. Heavier-than-air machines not only fly, but they carry passengers, mail, and freight. They do all the things that other carriers can do and have done and do it in a

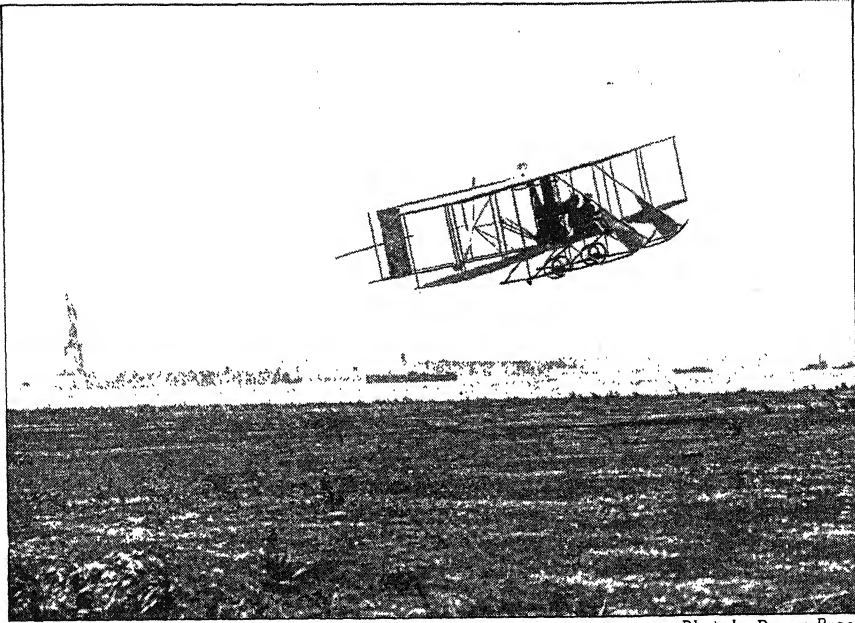


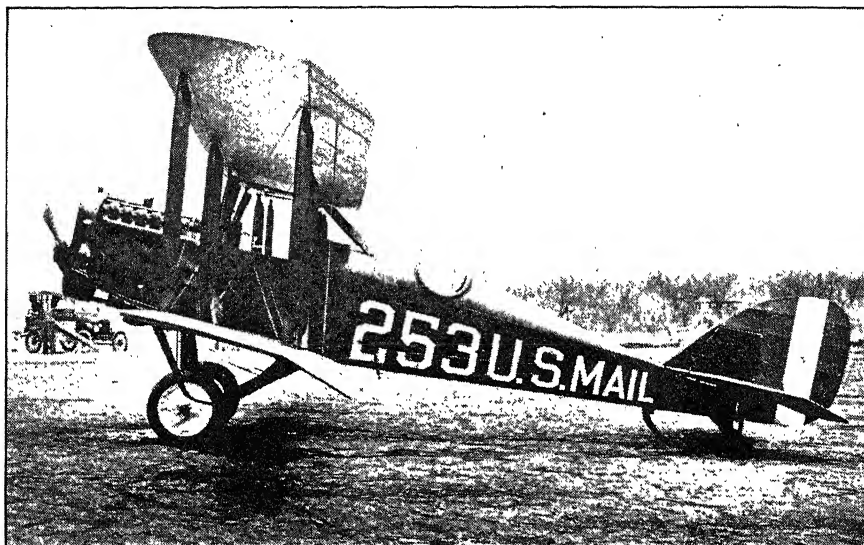
Photo by Brown Bros.

Wilbur Wright returning to Governor's Island after flying around the Statue of Liberty in 1909

fraction of the time. It is possible now to fly around the world in less time than it used to take to go from Boston to New York by stagecoach. No longer is San Francisco a matter of months or even days from New York City. We now think of the two cities as only hours apart.

In 1911 the first airplane flight across the continent from coast to coast was accomplished in 49 days! Later we applauded the aviator who, racing with the sun, flew from sunrise over the Atlantic to sunset in the Pacific. In 1937 Howard Hughes made a record by flying from Burbank, California, to Newark, New Jersey, in 7 hours 28 minutes and 25 seconds. That record, too, will surely be, if it has not already been, broken. Our air-age boast is, "The difficult we do at once; the impossible takes a little longer."

Kitty Hawk—1903. The year 1903 will always be a significant date and Kitty Hawk, North Carolina, will always hold an honored place in world history because in that year and from Kill Devil Hill in that place the Wright brothers made the first successful airplane flight. Like an awkward fledgling the plane traveled only a short distance, 852 feet, and kept aloft only a short time, 59 seconds, but it flew. That was the significant thing. From that day and place



Courtesy U. S. War Department

A pioneer mail plane that carried coast-to-coast air mail. Originally built for use in World War I, it was converted to mail-carrying use. It had no aids to navigation, no communication facilities and a cruising range of 300 miles. It traveled less than 100 miles an hour.

man's contest for the mastery of the air began. Wilbur Wright's next amazing feat was a flight all the way around the Statue of Liberty in New York harbor in 1909.

Time—in the air. Time in the air and the distances flown gradually increased. In the year 1910 Glenn Curtiss, another pioneer in aviation, flew all the way from Albany, New York, to Governor's Island in New York harbor, a distance of 142 miles. He flew at the rate of 49 miles an hour and was obliged to stop only three times to re-fuel and re-oil his machine! By 1918 mail was being flown from New York to Washington. By 1919 the more venturesome souls were trying to cross the Atlantic. The first attempt ended in failure after 14½ hours aloft, but only two weeks later a U. S. Navy plane succeeded in reaching Lisbon, Portugal, by the way of the Azores. Then, so fast are records made and broken, in another two weeks Alcock and Brown flew from St. Johns, Newfoundland, to Clifton, Ireland, nonstop. Only six years later, in 1924, came the inevitable trip around the world, accomplished by a United States Army airplane in 14 days and 15 hours actual flying time.

Establishing records. In the late twenties many notable achievements in aviation were made by various flyers in various directions. In 1926, seventeen years after Peary's discovery of the north pole,

Lieutenant Commander Byrd and Floyd Bennett flew over the pole. In May, 1927, Charles A. Lindbergh flew solo across the Atlantic in the *Spirit of St. Louis*. In November, 1929, while on a south polar expedition, Commander Byrd, with Bernt Balchen as pilot, took off from Little America for the south pole. After dropping an American flag over the pole they circled the polar plateau and returned to their base, having flown a distance of 1600 miles. Fliers find it one thing to fly with the wind, another to fly into it. The prevailing westerlies favor the flyer winging his way eastward across the North Atlantic. The westward crossing is more difficult. It was not until 1928 that two Germans and an Irishman made the first nonstop westward flight across the Atlantic. A few weeks later the first flight across the Pacific from California to Australia was made by Kingsford-Smith and two companions in 81 hours and 19 minutes flying time. The following year two Frenchmen flew from Paris to China, making a distance record of 4912 miles.

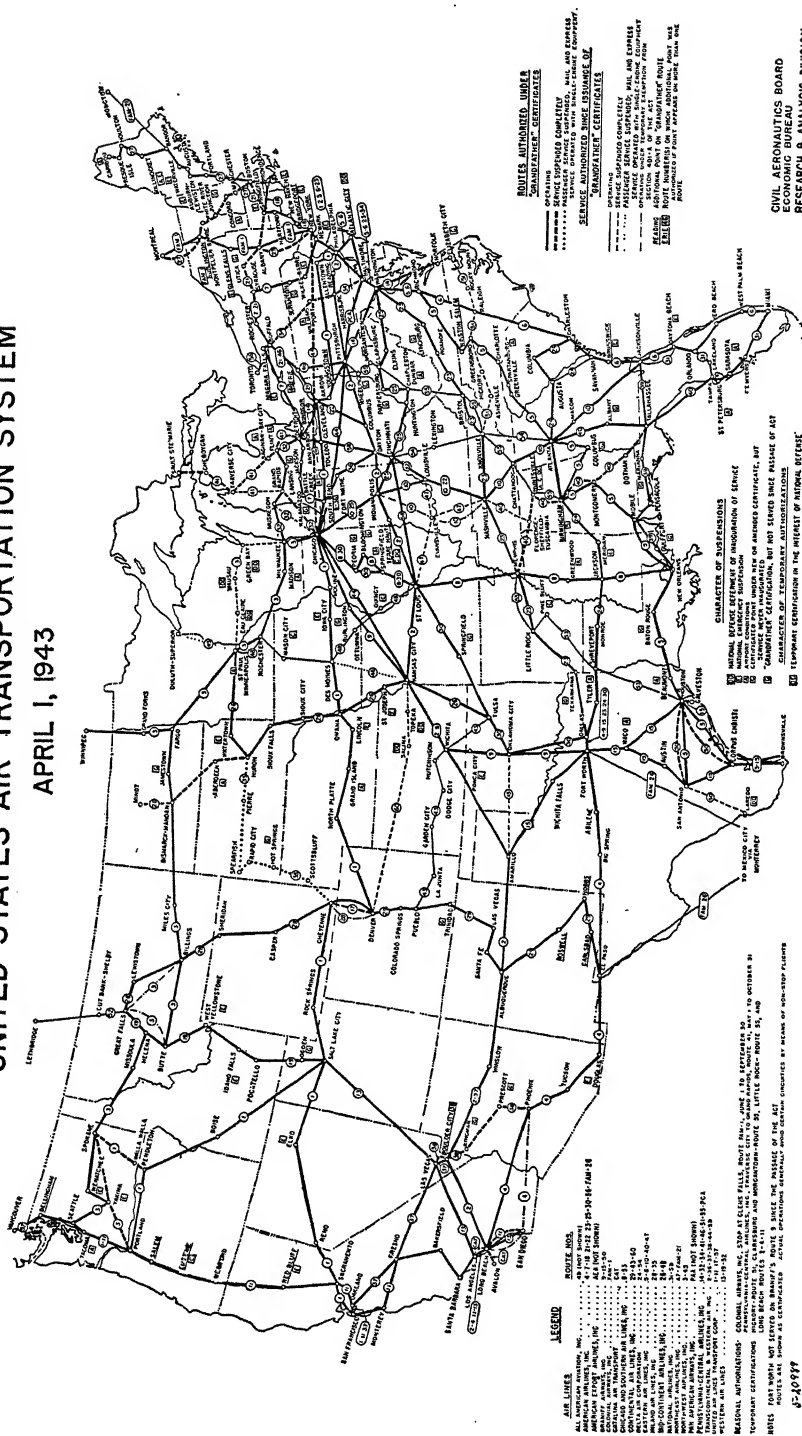
Mass flying. It was an Italian, General Balbo, who made the first attempt at mass ocean flying. Under his leadership fourteen planes flew from Italy to Bolama, Africa, where they took off for Brazil. Two planes cracked up in the take-off, but the twelve remaining planes succeeded in reaching Natal, where a third one came to grief. The others flew from Natal to Rio de Janeiro.

Experiments in flying. All of the early flights were made in the effort to establish records for speed, duration, distance, altitude, or direction. Some were stunts pure and simple, but, whether undertaken as stunts or for the most careful research, they all added their bit to the sum total of aviation experience.

Commercial routes. It costs money to fly. Stunt and experimental flyers were obliged to finance their own ventures or to secure the backing of a generous sponsor. After the experimental stage in aviation was passed and business interests saw that here was a field for the investment of capital, commercial routes were established. It has taken time, however, to educate the public and make this mode of travel popular. Consequently, from the beginning, in order to make a line profitable, it has been necessary to procure subsidies, that is, government aid, in the form of mail contracts or special mail rates. With the exception of routes to the gold fields of Canada and New Guinea practically all airway routes in all countries have been subsidized. The development of international routes has been hindered by the reluctance of various nations to permit passage of planes over their territory or to land at their airfields.

UNITED STATES AIR TRANSPORTATION SYSTEM

APRIL 1, 1943



CIVIL AERONAUTICS BOARD
ECONOMIC BUREAU
RESEARCH & ANALYSIS DIVISION
Courtesy Civil Aeronautics Authority

over 120,000,000 miles, carrying about 3,500,000 passengers and 15,000,000 pounds of express. There were over 2,000 airports and landing fields in the country. The leading airlines in North America stem from New York and Chicago. Other centers are Washington, Detroit, Buffalo, Boston, San Francisco, Los Angeles, Seattle, New Orleans, Dallas-Ft. Worth, and Miami. When plans were being made for the invasion of North Africa, it is said that for a time troop planes carrying fifty men took off from Miami every fifteen minutes.

Pacific Ocean lines. In addition to our overland and Atlantic routes Pan-American Airways began to fly trans-Pacific clippers in 1935. Up to the time of Pearl Harbor an airliner was scheduled to leave Alameda, California, near San Francisco, every Wednesday at 3 P.M. for Manila, where it was scheduled to arrive at 5 P.M. the following Tuesday. From Manila it flew to Hong Kong. It flew only during daytime. En route it made landings at Honolulu, Midway, Wake, and Guam, all American-controlled islands at that time. In the year 1938 the line carried 1019 passengers, over 7000 pounds of mail, and over 10,000 pounds of freight. In 1940 the same line opened two other important routes: one from Seattle to Juneau, Alaska, and one from San Francisco to Auckland, New Zealand. The Seattle-Juneau hop filled the last gap in the Pan-American line which now stretches from Nome, Alaska, to Santiago, Chile, nearly the entire length of the North and South American continents.

Canadian airways. Canada, with great distances to be traversed and many knotty transportation problems to solve, has been one of the first countries to pioneer in airplane freight service. First came air-mail service between Montreal and Vancouver. It is claimed that up to the outbreak of the war more freight was flown in Canada than in any other country except Russia and New Guinea. In both Canada and New Guinea the freight consisted chiefly of mining tools and equipment for gold mines otherwise inaccessible. Practically all northern trans-Atlantic airway services make use of the airfields of eastern Canada and Newfoundland.

South American airways. In the Pacific region of South America great progress has been made in aviation. It was forging ahead when the war came. Since then it has grown by leaps and bounds. The Panagra (Pan-American Grace Line) has taken over practically all the passenger, mail and fast express traffic that used to go by steamer. It is estimated that 5000 passengers a month, chiefly individuals on urgent business, are now being flown from the Canal Zone to Buenos Aires. It is said that the 1942 conference held



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This map shows who owned the air lines in South America before the beginning of World War II.

at Rio de Janeiro to decide whether South America should remain neutral or cast its lot with the United Nations would have been impossible had it not been for the airplane. The shortest route from Argentina to the United States is over the Andes to Santiago and then north. One of the most recent developments of the use of the airplane is to bring rubber out of the Brazilian jungles. Airplanes were first used to spot the trees. That was easily done because of a seasonal change in the color of foliage. Indians have been set to work to gather the rubber and bring it to focal points for shipment

to this country to relieve the critical rubber shortage. When the war is over, the lines now operating will already have established a strong link in global aviation. Natal in Brazil is the jumping-off place for much trans-Atlantic flying. It is strategically located opposite Dakar, the point in Africa nearest to the South American shores. It is sure to remain always a very important center for Brazilian and international aviation. It is interesting to note that Latin American airways were originally financed by Germany, Italy, and the United States. One of the best equipped and most capably managed lines was operated by Germans in Colombia where they were within easy range of the Panama Canal. The government took the line over at the outbreak of the war. Later it was merged with the Pan-American line.

Australian airways. Unlike the cities of this country and of Europe not all Australian capital cities are connected by roads and by railroads, but they do boast excellent air connections. Lines were subsidized by the government as early as 1920. In 1934 an Imperial Airways route between Australia and the United Kingdom was established. Australia was responsible for the maintenance of the service between Darwin and Singapore. In 1940 a weekly Sydney-Brisbane-Auckland, New Zealand, service was inaugurated. Just prior to the outbreak of the war there was a twice-weekly service by a Netherlands line between Batavia, Java, and Darwin. While few passengers were carried over these two latter lines large quantities of mail and express were transported.

European airways. The leading airlines of Europe lead out from London, Paris, and Berlin. These, of course, are all disrupted by the present war. In peace time European lines extended to the Near East, to India, and Australia, connecting with the Australian lines already mentioned. Other lines from Europe made connections with Cairo in North Africa and with Dakar in West Africa. At one time there was a Dutch line with planes flying by way of Dakar to Natal in Brazil, then north to the Dutch West Indies and the United States. Cecil Rhodes, who won for Britain a large part of its South African possessions, had his heart set on a Cape to Cairo railroad. Rhodes died over forty years ago and his dream has not yet come true. It may never be realized because the airplane has become the logical mode of transportation for such a tropical jungle as lies in the heart of Africa. For some time before the war regular weekly airplane service was maintained between the two extremities.

European and Asiatic Russia find in the airplane a mode of trans-

*Soofoto*

Uzbeks in their varicolored silk gowns are boarding an airplane at Tashkent, the capital of Uzbekistan, for a trip to "the roof of the world" in the lofty Pamirs.

portation ideally suited to their peculiar needs. The vast distances, the great expanse of Arctic waste, the extreme cold, have proved themselves only a challenge to the technically minded Russians. As early as 1922, and that is early from the aviation viewpoint, Russia had 250 miles of airways. All parts of the Soviet Union are now connected by national or international routes. Before the war Moscow had direct air connections with Berlin, Stockholm, Sofia, and Sinkiang Province in western China. In Asiatic Russia the airways follow the river valleys. The Russians, hugging the polar sea as they do, were pioneers in arctic flight. In the year 1936 they totaled nearly 1,400,000 miles of polar flight, carrying nearly 2,000,000 pounds of freight and 5400 passengers. The following year three Russian flyers made the first nonstop flight over the North Pole, flying from Moscow to San Jacinto in Southern California, a distance of 6262 miles in 62 hours and 2 minutes. That flight blazed a trail that is sure to become an important highway in the postwar world.

Japanese airways. Aviation lagged in Japan until the outbreak of the war with China. Distances within the country were not great and physical features were more or less a handicap. The occupation of Manchuria called for the first extension of Japanese lines. Then, with the conquest of China came further extensions. Japan, jealous of its privacy and sovereignty, never allowed foreign air service over its territory or to its airports.

Chinese airways. Like Russia, China had vast reaches of territory to be spanned. There being few highways and fewer railroads to offer competition, airways seemed the logical answer to China's great transportation problem. Beginning in the year 1930 three airway lines were established. One was strictly Chinese, one was American-Chinese, and one German-Chinese. The latter was ostensibly for the purpose of providing direct communication between China and Europe. Since the route crossed Manchuria, that line had to be abandoned when the Japs took possession of that province. Later, when the Japs invaded China, the other lines had to withdraw inland. So great was the need for transportation, however, that traffic increased in spite of shortened lines. Like Japan, China never sanctioned air passage over its territory nor the use of its airfields by foreign lines. Because China is now one of the United Nations, it gladly welcomes lend-lease relief which comes by planes which wing their way from America across Africa and "over the hump" of the Himalayas.

GUIDES TO STUDY

1. What were some of the early records made by airplanes? (See *World Almanac*.)
2. Who were the pioneers in aviation and what was the work of each?
3. How has the airplane aided in polar exploration?
4. What were some of the early long flights?
5. What was the importance of early experimental flights?
6. How has the Federal Government aided the development of aviation?
7. What were the leading centers of aviation before the present war? Why were those cities the important centers?
8. What were the chief routes in the Pacific area?
9. Why did Canada especially need air lines?
10. How has the airplane aided South American countries?
11. What reasons had Germany and Italy for establishing airways in Latin America?
12. What place did peacetime Europe hold in aviation? To what extent are the countries of Europe equipped with railroads as compared with the United States? What effect might that condition have on the growth of air lines?
13. Why would Russia especially feel the need of airways?

14. Why did aviation develop slowly in the Far East? What country led? Why?
15. In what ways can aviation help to develop China? Airplanes have done much to destroy China and they are doing much to save that country. Explain this statement.

TOPICS FOR CLASS DISCUSSION

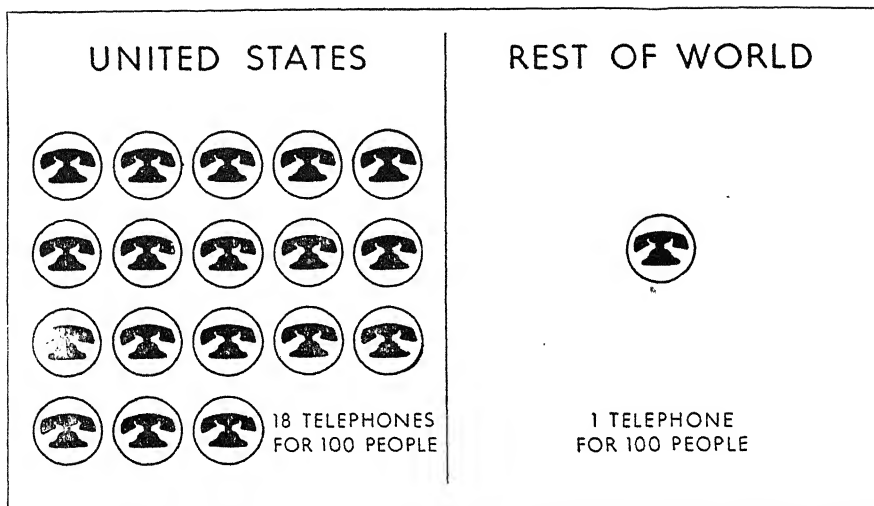
1. The airplane reduces time and space.
2. Work of the Wright brothers.
3. Flights to the poles.
4. The work of Commander Byrd.
5. First attempts to cross the oceans by plane.
6. How airplanes aid in defending a country.
7. Advantages of air routes over water routes; over railway lines.

WORK TO BE DONE

1. Assign to committees or selected members of the class special topics for research and report such as (1) the experiments of the Wright brothers; (2) Lindbergh's trans-Atlantic flight; (3) Flight of the Russians to California; (4) Other topics chosen by the class.
2. On an outline map of the world trace the leading air routes. (See p. 118.) Which of these do you consider the most important? Why?
3. Study the lives of some of the men and women who have done much to further the cause of aviation, including Glenn Custiss, Floyd Bennett, General Balbo, Amelia Earhart, Sir Hubert Wilkins.
4. Study the Natal-Dakar route and find out its strategic advantages.
5. List the regions in which the airplane is about the only means of transportation and learn the use of the plane in each region. (See other sections of this text on airplanes.)

7. COMMUNICATION—BY WIRE AND WIRELESS

The telegraph—electricity writes. One of Shakespeare's characters promised to put a girdle around the world in forty minutes. Today we call that slow. Light and electricity travel the same distance in a third of a second. When man trained electricity to do his bidding, he found a messenger that moves with the speed of the lightning's flash. From earliest times there was felt the need of sending messages long distances in the shortest time possible. Signals were flashed from hilltop to hilltop by means of fire, smoke, or by means of arms of wood waved from the top of a pole. Messages were sent from ship to ship and ship to shore by flags. When a feudal lord wished to wage war against an enemy, he sent a runner with a flaming torch to one of his villages. The torch was grasped at once by another runner who took it to the next settlement. This



Courtesy American Telephone and Telegraph Company

What do the number of telephones in a country in proportion to the number of people suggest as to the country's wealth and industrial progress?

was kept up until all the lord's warriors were called together.

Up to the time of Samuel F. B. Morse there had been little advance in rapid communication. Messages were at that time sent by men on foot or on horseback or in horse-drawn vehicles. Morse first became interested in the telegraph when he learned that a current of electricity could be interrupted at any point along the wire. He devised a crude instrument and a system of dots and dashes which is practically the Morse code used today. He had no money, however, with which to construct telegraph lines. Years of effort were spent in trying to induce the governments of European countries to advance funds. Finally in 1843 Congress appropriated \$30,000 to construct a line from Baltimore to Washington.

Many people found it hard to believe that a message could be carried by wire over long distances. A train dispatcher in Pennsylvania refused to carry out an order received by telegraph until the order was brought to him by messenger. Within a few years telegraph companies were organized in various parts of the country. Nearly all these were united in 1857 to form the Western Union. During Morse's life his system was put to use in many of the countries of Europe and in Australia as well as throughout the United States.

Since Morse's day telegraph lines have been extended until all countries of the world have been connected by wires over the land and by cables under the seas. After repeated failures England and

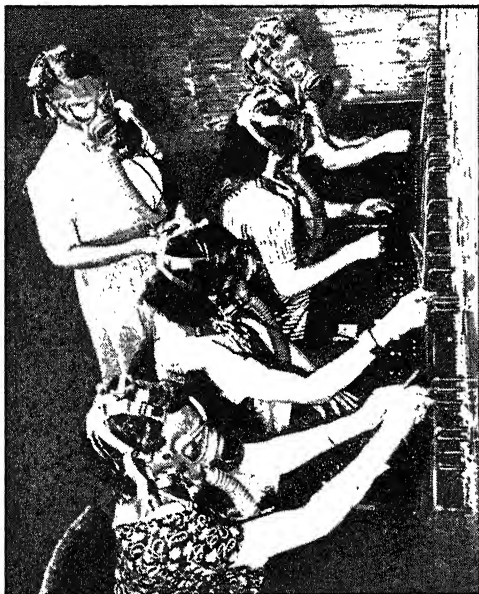


Photo by Holmes I. Mettee, Baltimore

By water, rail, and road these great cable reels will travel to every corner of the United States, wherever the communications requirements of defense call for expanded telephone service.

the United States in 1857 were connected by submarine cable. Queen Victoria and President Buchanan exchanged messages. In laying this line two steamers loaded with cable met in midocean, joined the ends of their wires and then sailed in opposite directions, laying the cable as they sailed. But in about two months the line failed to work, and it was not until 1866 that a new one was laid and messages were again sent across the Atlantic. Before inventing the telegraph, Morse, who was visiting in England, wrote to his mother in America, saying, "I wish that in one instant I could tell you of my safe arrival, but now we must wait four long weeks to hear from one another." The Atlantic cable was Morse's dream come true, and Morse himself had done a great deal to make that dream a reality.

Since 1865 many other cables have been laid across the Atlantic. In 1902 a cable was laid under the Pacific Ocean. This cable is about 8000 miles long and in some places lies six miles below the surface of the ocean. Early failures in laying Atlantic cables led to the mak-



Courtesy American Telephone and Telegraph Company
An army telephone switchboard during a gas-mask drill

ing of stronger and better cables and thus made the spanning of the Pacific possible.

The telephone — electricity speaks. The telegraph made it possible for an operator to cause an instrument many miles away to make dots and dashes on a strip of paper or to produce sounds. Either the dots and dashes or the sounds could be at once translated into words. The Bell telephone carried the words themselves from speaker to listener.

Bell was born in Edinburgh, Scotland, but came

to the United States when about twenty-five years of age. The first words carried were spoken by Bell in his attic workroom in Boston to a room two floors below. The completed instrument was first shown at the Centennial Exposition in Philadelphia in 1876. It received little notice until it attracted the attention of the emperor of Brazil and Sir William Thomson, a noted English scientist. The Englishman pronounced it the most wonderful thing that he had seen in America.

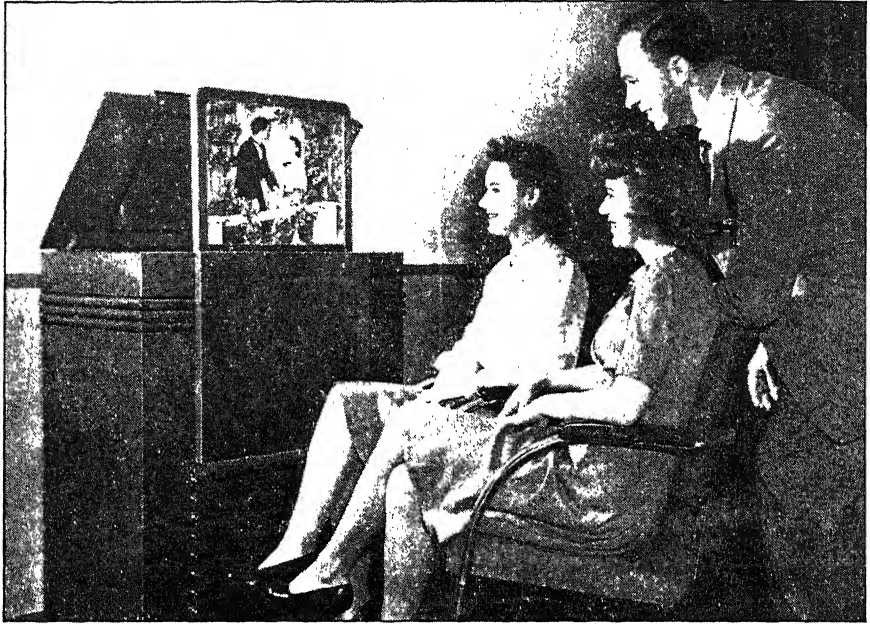
Many improvements had to be made before the telephone became the useful instrument that we know today. Exchanges had to be planned so that one telephone could be linked up with any one of hundreds or even thousands of other instruments. Other inventions had to be made before the human voice could be carried from the Atlantic to the Pacific. In January, 1915, this feat was accomplished. Mr. Bell in New York spoke the same words to Thomas Watson in San Francisco that he had spoken to him as his assistant from the attic in Boston. Mr. Bell's words were, "Mr. Watson, please come here. I want you." Mr. Watson replied, "It would take me a week now." Since then other improvements have been made until the telephone in our homes can be connected with those in almost any country in the world.

Wireless—electricity broadcasts. In April, 1912, the new steamship *Titanic*, then the largest vessel afloat, was steaming at full speed to make a record voyage across the Atlantic. Without warning, the vessel crashed into a huge iceberg and more than half of those on board perished. Upon landing in New York the survivors went in a body to the hotel where Guglielmo Marconi, the inventor of wireless, was staying and there cheered the man who had made possible their escape from death. The damaged ship had sent out wireless calls for help, and ships sailing near by had been able to save hundreds of lives. Without the wireless all would have been lost. This was not the first time wireless had been used for this purpose, but it was the first time that so many lives had been saved in mid-ocean.

Marconi, an Italian, was the first to transmit messages without wires. At first the distance between the two instruments was very short. But by patient experimenting distances were gradually increased. In 1899 his messages spanned the English Channel and four years later wireless messages were being sent across the Atlantic. Since that time all countries have been united by the wireless telegraph and the wireless telephone. From Marconi's discoveries has come the radio with receiving sets in practically every home. An address made by the President of the United States is heard all over the United States and in foreign countries. The king of England speaks and his subjects scattered all over the world listen. Telephonic communication by means of wireless is carried on across the oceans, also from ship to shore, and between airplanes and the earth. We can hear such conversations over our radios.

No other commodity pays so high a price for transportation as news. News dispatches from the war in the Far East cost one dollar and fifty cents per word. The cost of sending 2000 pounds of coal across the Pacific Ocean is but a trifle more. The high price for news is the price paid for speed. Before the days of the telegraph years passed before a ship was given up for lost. Now it is a matter of days or a few weeks at most. If a ship is equipped with radio and danger threatens, news of it is found in our newspapers within a few hours or is announced over the radio even more quickly.

Pictures of persons and events are sent by wireless from place to place, even across the oceans. Illustrations used in newspapers and magazines are sent from distant places in this way. Such a picture is known as a *radiophotograph*. In a few places pictures of moving scenes are broadcast with sound, and both pictures and sound are



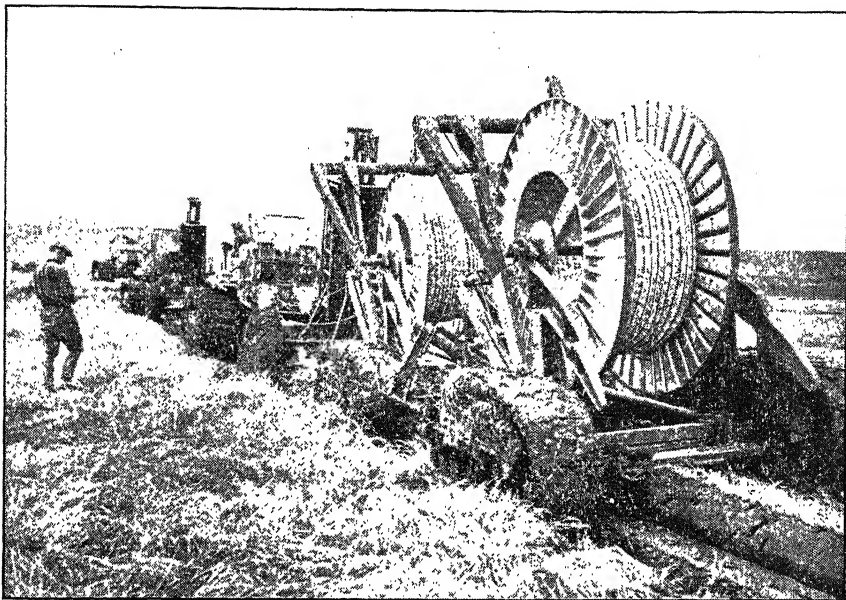
Courtesy Radio Corporation of America

The new developmental large-screen television receiver. Radio promises many marvels after the war.

recorded on receiving sets in the home. The process whereby distant objects whether still or moving are made visible on a screen is known as *television*. Today we are told that the general use of television awaits only the end of the war. The demands of war industries make it impossible to obtain the materials necessary for the manufacturing of television equipment. There is little doubt that in a very few years television sets will be almost as common as are radios today.

GUIDES TO STUDY

1. What were some of the early means of communication? Are any of them used today?
2. How did Morse become interested in the telegraph?
3. Why do inventions like the telegraph some into use slowly?
4. Describe the growth of the telephone system. What is the system called in our country today? Why?
5. Why does wireless seem to be the most wonderful of the means of communicating by electricity?
6. Why are our newspapers able to bring us news of foreign events almost as soon as they occur?
7. Why do the radio and the broadcaster play so large a part in our lives?
8. Why does television await only the end of the war?



Courtesy American Telephone and Telegraph Company

This telephone cable-laying train plants a cable three feet deep in the bog through which it must pass.

TOPICS FOR CLASS DISCUSSION

1. Communication—past and present.
2. Electricity writes, speaks, and broadcasts; the speed of light and electricity.
3. The disappointments of an inventor.
4. Inventors are often poor men. Why?
5. Edison and the phonograph.
6. How V-mail is sent to our soldiers abroad.
7. Improvements in communication and world progress.
8. The difference between a telegram, a radiogram, and a trans-oceanic cablegram.
9. Communication in the battle areas—helpful and harmful.
10. Communication and the weather.

WORK TO BE DONE

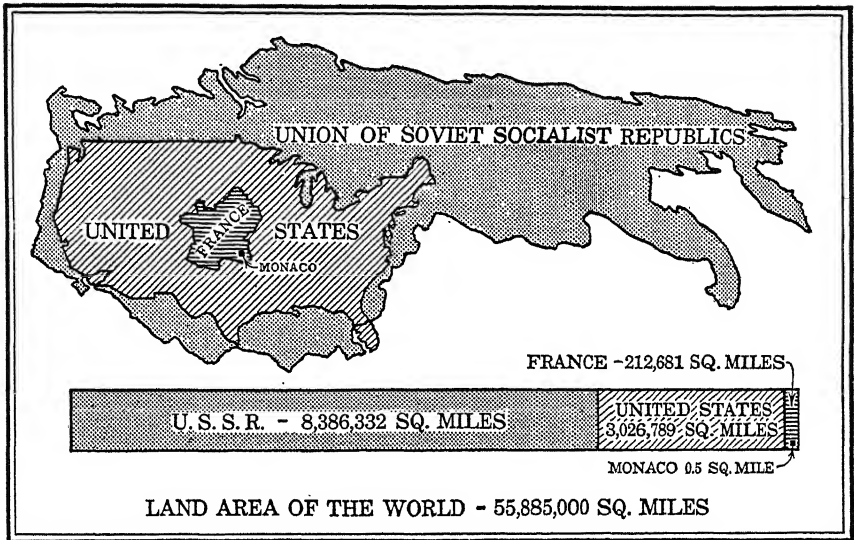
1. Study the lives of Morse, Bell, and Marconi.
2. Make a special study of the use of the radio in time of war.
3. Appoint some member of the class or a group to study and report on the laying of the Atlantic cable.

UNIT VI. *THIS WORLD OF NATIONS*

I. DIVERSITY OF LANDS AND RACES

Unity in diversity. In studying global geography we are struck by the unity of the land masses of the earth. In this global world our ideas of space and time have had to be continuously revised since the speed of airplanes has been increased to 300 and more miles an hour and the radio, telephone, and telegraph have given instant communication the world around. Notwithstanding this seeming unity and the unification achieved by these miracles of transportation and communication, we must not overlook the fact that this world contains some seventy nations differing widely in their geographical, social, and political conditions. Probably it would be more accurate to speak of them as "sovereign states" rather than as nations. Besides these seventy sovereign states there are vast expanses with millions of inhabitants that are the so-called colonies and dependencies of some of the more powerful sovereign states.

A look at the continents. The most pronounced fact about these states is their wide diversity in size, population, resources, culture, and the activities of the people. Consider the size of Vatican City State occupying one sixth of a square mile with that of the Union of Soviet Socialist Republics occupying one seventh of the land surface of the earth. Then consider the British Empire on which the sun never sets and the small petty states of Andorra, Monaco, San Marino, and Liechtenstein in Europe, a continent consisting of more than thirty nations or sovereign states. This situation in Europe is in contrast to North America, a continent of double the size of Europe, with only two nations from the Rio Grande to the ice-locked harbors of the Arctic Ocean. South of the Rio Grande in North America is Mexico, another large country, but one more nearly like the countries of Central and South America because of similarity in language, culture, customs, and ancestral inheritance. The rest of the North American continent comprises six small countries, Panama, Guatemala, Honduras, Nicaragua, El Salvador, and Costa Rica, and a colony, British Honduras. Three island sovereign states are found in the West Indies—Cuba, Haiti, and Dominican Republic. In the continent of South America there are ten nations or sovereign states—Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Argentina, Uruguay, Paraguay, and Brazil. In the vast continent of Asia and its adjacent islands are located eleven nations—only ten of which are sovereign



After Davis

A graphic representation showing how countries differ in size

states—Arabia, Persia, Afghanistan, Thailand, China, Japan, Iraq, Syria, Lebanon, and Turkey (part of which is in Europe). There are also India (a nation under British sovereignty), Burma (a British crown colony), Asiatic Russia (part of the Union of Soviet Socialist Republics), and two minor states, Nepal and Bhutan.

In the whole of Africa there are only three sovereign states—Egypt, Ethiopia, and Liberia—with the Union of South Africa virtually independent though a British dominion in fact. Two other virtually sovereign states in the Pacific Ocean southeast of Asia are the British dominions of Australia and New Zealand.

Multipeopled Europe. When we consider the continent of Europe (and the adjacent islands) which is only about ten per cent greater in area than Canada and only a little larger than Brazil or the United States (including Alaska), we find that there are some thirty-odd sovereign states or nations there. Let us enumerate them to be sure. We have Great Britain (or the United Kingdom), Eire, Spain, Portugal, Switzerland, France, Italy, Luxembourg, Belgium, The Netherlands, Denmark, Norway, Sweden, Finland, Rumania, Latvia, Estonia, Lithuania, Russia (U.S.S.R.), Poland, Germany, Czechoslovakia, Austria, Hungary, Bulgaria, Greece, Yugoslavia, and Albania. Then there are the small states of Liechtenstein, Monaco, San Marino, and Andorra, as well as the papal state of Vatican City. While it is true that many of these states no longer exist according

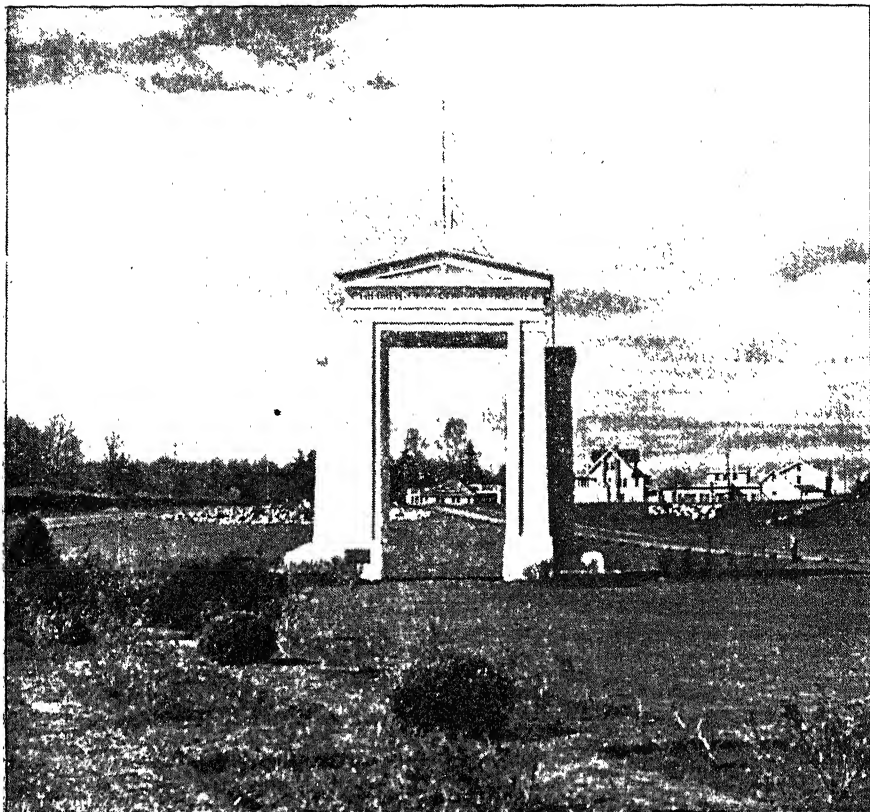


Photo by James Sawders









The peace arch at Blaine, Washington, on the All-American Highway. What is the significance of the inscription, "Children of a Common Mother," at the top?

to German-made maps because Hitler for the time being has destroyed their sovereignty, there is every reason to believe that eventually the Nazi and Fascist menace will be destroyed and most of the old boundaries will be amended or restored. Today only a few of these countries have not been crushed under the Nazis' superior military might. In all Europe only Portugal, Spain, Switzerland, Sweden, and Turkey have not felt the full terror of Axis aggression. Of these Spain and, until recently, Sweden were more closely linked to the Nazis than to the United Nations.

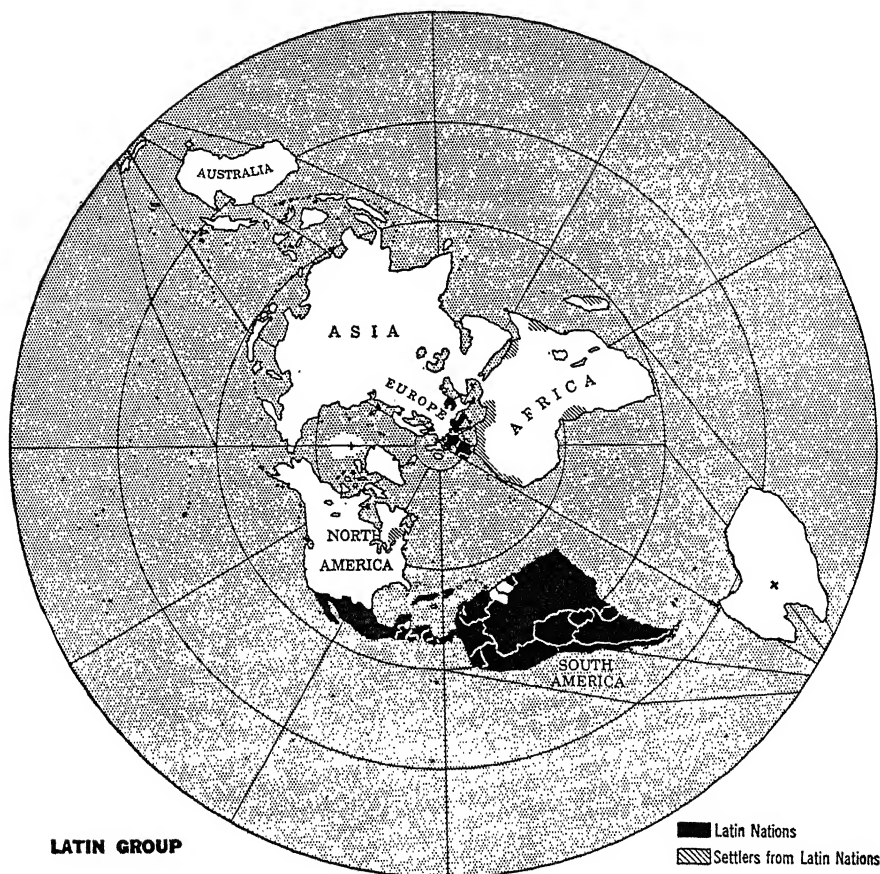
Defenseless frontiers. One reason for German success besides the military strength built up over many years was the defenseless frontiers of the European countries. Boundaries as a rule are man-made. When one looks at a map of Europe, one is immediately impressed by the irregularity of boundary lines and the variety in the shapes of countries. In geography we speak of natural boundaries,

such as the Rio Grande between the United States and Mexico or the ridge of the Andes that separates Chile from Argentina and Bolivia. Then we may have the purely artificial boundary, such as that between the United States and Canada, which is a line of demarcation mutually agreed upon by the affected countries. Some frontiers can only be explained by territorial gains achieved by war and conquest at the expense of a neighboring nation. Sometimes boundaries have been settled by arbitration where territory was in dispute and the contending parties did not wish to resort to war. New frontiers have been secured by the absorption of smaller countries by a powerful neighbor to get access to the sea as was the case when the Baltic republics became part of the Soviet Union recently. Where the military clique has been strong in any government, the desire has always been to secure boundaries that could be easily fortified and made defensible against a neighboring state. This was especially true when armies fought behind breastworks and from pillboxes. The famous Maginot Line, the Mannerheim defenses, and the Mareth fortifications were examples of this form of military defense works. Bombing planes, transports carrying parachutists, tanks, and heavy artillery have all outmoded this kind of defense. The modern war of movement on the ground and in the air has made this style of static defense suicidal.

After World War I, when a number of new states were set up in Europe, it was attempted to arrange boundaries so as to include in a single state the areas in which a majority of the people were of the same national origin. The plan of the Atlantic Charter seems to be the employment of plebiscites (free choice of the inhabitants) to per-

ATLANTIC CHARTER	
	FIRST: no aggrandizement, territorial or other
	SECOND: no territorial changes that do not accord with the freely expressed wishes of the peoples concerned
	THIRD: the right of all peoples to choose the form of government under which they will live
	FOURTH: enjoyment by all states -- of access -- to the trade and to the raw materials of the world
	FIFTH: for all, improved labor standards, economic adjustment and social security
	SIXTH: to all nations the means of dwelling in safety within their own boundaries
	SEVENTH: all men to traverse the high seas and oceans without hindrance
	EIGHTH: the abandonment of the use of force

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The Latin nations occupy more territory in the New World than any other group.

mit the location of national boundaries according to self-determined popular choice. Other considerations have no doubt been influential in the determination of boundary lines. Two others may be mentioned—religion and language. These two considerations will be considered later.

Hitler's one object in his "New Order in Europe" was to wipe out all boundaries, destroy the sovereignty of the states, and reduce the other nations to slavery for the benefit of the master German race. His failure to accomplish this design is going to impose a difficult task on the victorious United Nations when they sit around the peace table. It is to be hoped that neither political nor military considerations will be permitted to determine the boundaries in the continents where war and conquest have wiped them out but that the boundaries will be located on humanitarian principles based on the



The Anglo-Saxon group occupies more territory in the New World than in the Old.

general welfare so as to provide greater stability and help promote a permanent peace.

Race and color—the Latin nations. A look at the nations from the point of view of race and color cannot be without interest in its influence on the relations among nations. First, let us consider the so-called Latin nations that trace their heritage of culture, language, and laws back to ancient Latium with Rome as its center of civilization and power. Italy by virtue of inheritance stands foremost in this group. France, Spain, Portugal, and Rumania are all Latin nations though all these and Italy have had their Latin blood diluted by admixture with alien peoples. Both Switzerland and Belgium can claim kinship with the Latin races because of the relation of parts of their populations to other Latin nations, French and Italian in the case of Switzerland and French in the case of Belgium. In addition there

are in the New World all the countries of South America and all the countries in North America south of the Rio Grande, as well as a large population in Canada, especially in the province of Quebec. Many nationals, especially French and Italian, have settled in the colonial possessions in Africa with the idea of binding these colonies closely to the mother countries. The Latin races constitute the largest racial group of nations and they are much alike in language, religion, and culture.

The Anglo-Saxon and the Teutonic groups. There is another group, the so-called Anglo-Saxon group, which includes Great Britain, the dominions—Canada, Australia, New Zealand, and the Union of South Africa—and the United States, although the latter has become a melting pot for all nations despite its Anglo-Saxon beginnings.

Two other important groups are found in central and northern Europe: the Teutonic group consisting of Germany and Austria; possibly the Dutch of the Netherlands may belong to this group; and the Teutonic Scandinavian group consisting of Norway, Sweden, and Denmark, together with Iceland (now an independent state). These two groups have sometimes been put into a single group—the so-called Nordic nations.

The Slavic group. Probably next in importance are the Slavic nations, Russia, Poland, Czechoslovakia, Bulgaria, and Yugoslavia. If there is any racial unity among this group, it is probably more noticeable in Russia's interest in these nations than in any cohesiveness among the smaller nations.

Two Asiatic groups. Finally there is a small group of Semitic nations—Persia, Arabia, and Syria—and there are the yellow-brown Mongol-Malay nations, China, Japan, and Thailand. Despite kinship from common ancestry in some remote past, no ties have bound together the members of this latter group. Each has developed its own culture. Of the three Japan has been most affected by contact with Western civilization. It rapidly developed as a commercial, industrial, and military nation and soon came to be recognized as one of the Great Powers. Its military and naval strength was greatly underestimated by the democracies until it overran much of China in the years following 1937 after having already conquered Manchuria and having set up a puppet government in the Japanese Manchukuo in 1931. While peace negotiations were being carried on in Washington between Secretary of State Hull and the Japanese ambassador and an envoy extraordinary, a sneak attack was made on Pearl Harbor, Hawaii, on December 7, 1941. This brought the

United States into the war as a belligerent against the entire Axis, in what had now become a global war.

Simultaneously Japan started a smashing offensive against Wake Island, Guam, Midway Islands, and the Philippines—all American possessions—and likewise against the colonies of Britain and the Netherlands in the Southwest Pacific. They conquered in rapid succession the chief possessions of our country in the Pacific except Hawaii and Midway Islands and overran Malaya including Singapore, the Netherlands Indies, parts of the British East Indies, and Hong Kong. Australia faced the danger of imminent invasion by the fanatical soldiers of Nippon whose successes made them think they were invincible. Even India was threatened by Japanese victories in Burma.

Two weeks after Pearl Harbor the Thai government signed a ten-year Treaty of Alliance with Japan agreeing to assist that country in the war against the United Nations. Consequently Thailand declared war on the United States and Great Britain on January 25, 1942.

The Japanese have looked upon themselves as a god-descended race and therefore superior to all other races. They have been taught that they are destined to rule the world by virtue of their superiority. The military clique that has ruled Japan has instilled into the common soldier that death for the emperor and the fatherland is glorious. Hence the Japanese soldiers endure any hardships, fight with fanatical zeal, and die rather than surrender. It is a Japanese boast that Japan has never lost a war.

Difference in religious beliefs. Religion does not play the part it has in the past in the relations between nations. Yet it is another element of similarity or dissimilarity. Certain nations are officially or predominantly Roman Catholic Christians, as the so-called Latin nations of Europe and America, Austria, and others, who look to the Pope as the supreme head of the Church. Other nations are predominantly Protestant Christian, such as Great Britain, the United States, the Scandinavian countries, and others. There are also the Greek Catholic Christian nations, Greece, Rumania, and others. Then there are all the nations of the Mohammedan world and Asiatic nations that are wholly or in part Buddhist, Shintoist, or Confucianist. Despite these differences in beliefs religion does not seem to be a divisive force in the relations among nations today.

Language as a potent influence. Language seems to have greater binding power among nations than either race or religion. Common or kindred languages are more important than race or re-

ligion because of the importance of language in intercourse and communications.

The French language. The French language serves to bind to France such countries as Belgium, Switzerland, and Luxembourg. French is spoken in social, political, and financial circles in Brussels and eastern Belgium. It is the tongue of western Switzerland, is heard frequently in the capital at Bern, and was used almost exclusively in Geneva when the League of Nations was in action. French long held a supreme place as the language of international intercourse and diplomacy. It is also spoken in the French colonies and in the Negro republic of Haiti.

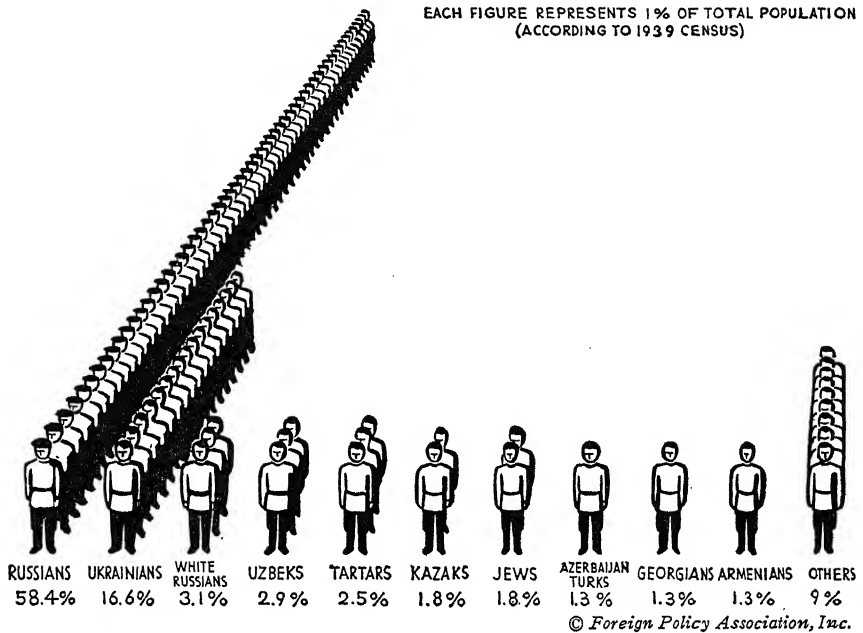
The German language. The German language group is small and less important than the French. It includes two countries, Germany and Austria (now considered by the Germans as part of Germany). German-speaking emigrants have carried their language to all the surrounding countries to which they have migrated and have continued to use it in preference to learning the native speech. German is predominantly spoken in Switzerland in the cantons that have been peopled from the fatherland.

The English language. The English-language group is far more widespread. English is the language of the British Isles, the United States, Canada, South Africa, Australia, and New Zealand although Gaelic is heard in Ireland, Welsh in Wales, French in Quebec, and Dutch in South Africa. In intercourse among nations and in diplomacy English has become a rival of French especially in the Far East and with the Spanish-speaking countries of the New World.

The Spanish language. Spanish is the language of the next largest group including as it does Spain and all the republics south of the Rio Grande except Haiti and Brazil, where Portuguese is spoken.

The people of the United States are greatly interested in the Spanish-speaking countries to the south for many reasons. They, with the nations of North America, constitute the most compact group of democracies in the world. These countries have many resources and raw materials which are vitally needed by us both in peacetime and in wartime. They constitute a large potential market for most of the products of our factories. They need our capital to develop their resources. They need our engineering skill to improve or provide better communications and transportation. They offer a great field for the development of aviation—a field in which our country leads the world. Racial and religious differences between our country and these countries are apparently insignificant in our

THE PEOPLES OF THE SOVIET UNION



mutual relations. However, the language difference is of considerable importance, but it is one that can be overcome. All our schools should have Spanish language classes. There should be a larger exchange of students, especially of college grade, fostered by the respective governments and our institutions of learning. Prospective tourists should be encouraged to study Spanish in preparation for a trip to our southern neighbors. Much has been done by our good-neighbor policy to cement the friendship between the United States and Mexico and all the states of Central and South America. The value of Vice-President Wallace's recent visit to these Spanish-speaking countries was greatly increased by his ability to speak in their native language to the vast assemblages that greeted him on so many occasions.

Other languages. The Scandinavian group of nations speak languages that differ markedly from the languages already considered and from one another so that there is little binding force in their related tongues.

The five Slavic nations have no common language, which may account to a considerable extent for the lack of sympathy and friendliness among them. Russia, the largest of the Slav states, has

a population that speaks 150 languages or dialects and yet this country has attained a surprising unity—political, cultural, and industrial—in spite of this great diversity of spoken languages.

No other language groups of importance exist. In fact, there seems to be only confusion of tongues, a veritable babel, which leads to misunderstandings and antagonisms.

Wealth and poverty of resources. There are wide differences in resources among the various nations. The United States has rich, developed resources of coal, iron ore, and petroleum. Argentina in almost the same latitude south of the equator is practically without any of these. Chile and Mexico are both rich in mineral resources with workable deposits of gold, silver, copper, iron, manganese, salt, and sulphur. The former has enormous beds of nitrate; the latter has none. Valuable minerals are abundant in Bolivia and Peru, but none is found in Arabia. France has much fertile soil while Germany is compelled to use fertilizers to enrich its soil to secure adequate production. Paraguay has an abundant rainfall while in Arabia the rainfall is negligible. Egypt is a land of a single river while innumerable streams flow from the mountains and lakes of Sweden into the Gulf of Bothnia and the Baltic Sea. The cork oak grows in Spain and Portugal but in few other places in the world. Carnauba wax is produced nowhere else in the world in commercial quantities but in Brazil which therefore has a virtual monopoly of this important product. Practically the whole world is now dependent upon Brazil and the countries of northern South America for its coffee although the coffee plant originated in the Old World. Curiously enough, Brazil, the original home of the rubber tree, allowed its monopoly in the production of rubber to pass to the East Indies. An infinite number of cases could be cited to show how unequally the natural resources of the world are divided among the nations. An enormous range of climatic conditions makes for differences in health, energy, and accomplishments of the peoples inhabiting the earth.

Differences in forms of government. Among the sovereign states of the world there exist various forms of government. They differ chiefly in the degrees of freedom allowed to the governed. To our way of thinking a democracy offers the greatest freedom to the individuals composing it. We live in a democracy. We know no other way of life. We take our freedom as something to which we have a right and not as something for which we should be especially thankful. We can listen to broadcasts at home or to those from foreign lands any time we choose. The broadcasters at home are



Photo from Philip Gendreau

Here citizens of a democracy are voting by secret ballot for candidates of their own choosing for public office. This is a privilege and a responsibility not permitted under a dictatorship or totalitarian government.

free to say what they please. If they criticize the Government or even the President, they are not imprisoned or put to death. Our newspapers are also free. We in the United States guard jealously the "freedom of the press." We believe that our freedom of action depends largely upon freedom of the press and freedom of speech.

We choose the officials who have charge of our government, be it city, state, or nation. If we do not approve what they do, we elect others to take their places. If a person is accused of wrongdoing, he is taken before a court where he has a chance to defend himself by presenting his side of the case. Our schools are free to teach what the school officials in each town or city believe should be taught. We are free to worship as we will. Churches of all denominations have equal rights. We love this freedom, this way of life. It is because we mean to keep it that we are spending billions to win the war. We may be obliged to make great sacrifices before we again feel that our freedom is secure. Freedom is obtained with great sacrifice and held only by eternal vigilance.

All the countries south of the United States—Mexico and the countries of Central and South America as well as Cuba, Haiti, and Dominican Republic in the Caribbean Sea—are democracies whose governments are patterned more or less upon our own. Unfortunately, however, not all the freedoms we enjoy are permitted in some of the Latin American countries to the south.

Democracies *versus* dictatorships or totalitarian states. We call a country ruled by a dictator a *totalitarian state*. In such a land all authority rests in one person. Those who try to overthrow him are either imprisoned or put to death. The people have no voice whatever in the government. If the people in a totalitarian state are permitted to vote on a question, they know very well how they are expected to vote and most of them are afraid to vote in any other way. Such a formality is no doubt for the purpose of trying to give the impression at home and abroad that the people have some voice in the government.

What we call *censorship* of the press and radio is very strict. Newspapers publish only what the government permits them to print. Radio broadcasts include only what the government allows. Citizens are forbidden to listen to foreign broadcasts. If they disobey and are discovered, they may be fined, imprisoned, or even executed.

In a totalitarian state there is little or no religious freedom. If church services are permitted at all, members of the police force are present to see that no criticism is made of the government or of the officials. If pastors are thought to be disloyal, they are arrested and sent to concentration camps.

Citizens under a dictator must do the kind of work that is assigned to them. Children are trained not as their parents choose but as the State decides. Life is for the State and not for the individual.

The three Axis countries—Germany, Italy, and Japan—are good examples of totalitarian countries or dictatorships. In Germany Adolf Hitler dominated the Nazi Party and was supreme ruler. In Italy Benito Mussolini through the Fascist Party, which he founded, ruled with an iron hand until he was ousted by King Victor Emmanuel following the military successes of the United Nations in the Mediterranean area. In Japan the military clique is the dictator. In Spain with the aid of Hitler and Mussolini, Franco set up a Fascist state.

In Europe before the war there were more states ruled by monarchs than there were democracies or republics. Great Britain although it is a monarchy is very democratic as are also the Scandinavian countries and the Low Countries—Belgium and the Netherlands, all of which except Sweden have been overrun by the armies of Hitler. In the countries conquered by the Axis restrictions on the freedom of the population are even more rigid than in Germany. Any attempt to thwart the will of the conqueror is put down ruthlessly. Those considered likely to oppose the new rule are put in concentration

camps and kept there. When the German army enters a country over which it has gained control, food, clothing, machinery, and stocks of goods in the stores in large quantities are transported to Germany. German marks are substituted for the money of the country in such a ratio that goods sold bring only a small part of their real value. Men of the countries overrun by Germany are sent to Germany and forced to work in fields and factories. Hitler has declared it to be his intention to reduce the inhabitants of conquered territories to a condition similar to that of slavery. The rewards of their labor is to be mainly for the benefit of their masters, the Germans. Because of German rule and because all ordinary business is necessarily reduced almost to a standstill, there is much suffering in many of the occupied countries. Britain does not permit supplies to enter the conquered countries from overseas because the British government believes these goods will be forwarded to Germany and will thus be used to strengthen the enemy. Thus the people in the conquered countries suffer in two ways—from want of the actual necessities of life and quite as much from loss of the liberties which they have always enjoyed.

Aftermath of a global war. With such widespread differences among the nations as have been noted the paramount questions arise: Can a global peace be achieved? Will it be a lasting peace? Will it be an interlude in the preparation for a new war? No one knows the answer to these questions. A great deal will depend upon the attitude of those who sit around the table at the peace conference. If the framers of the peace abide by the principles of the Atlantic Charter promulgated August 14, 1941, and indorsed by the United Nations January 1, 1942, and if they profit by the mistakes made in the peace treaty following World War I, there is hope that a just and lasting peace may be achieved.

GUIDES TO STUDY

1. In what ways do peoples differ? What agencies tend to make them unlike? What factors tend to unify people? What will be the effect of modern communication and air transport on world unity?
2. Why are there few sovereign states in Africa?
3. Why do you think Europe has been divided into many countries? After the war would it be well to have the old boundaries restored? Why?
4. What are the different types of boundaries which separate countries? What do we mean when we say that boundaries are man-made? How were European boundary lines drawn after World War I?
5. What countries are included under the term Latin Nations? Why? What is the difference between race and nationality?

6. What countries are in the Anglo-Saxon and Teutonic groups?
7. What countries are included in the Slavic group? The Semitic nations? The Mongol-Malay nations?
8. What proof is there that Japan more than any other Eastern nation has been influenced by contact with Western civilization? How may the accomplishments of the Japanese in peace and in war be explained?
9. How are the Japanese treating other nations of the Mongol-Malay group?
10. Is race, language, or religion of greatest importance in leading to alliances between peoples and countries?
11. Show that differences in languages tend to separate peoples. What languages are commonly used in international conferences? Why? What one language would serve you best in Europe? In South America?
12. What are our relations with the people of Latin American countries?
13. Show that nations differ greatly in their natural resources. Of what importance is this difference?
14. What does it matter whether a country has a democratic form of government or is controlled by a dictator?
15. What determines the kind of government which a particular people may have? Do you believe a people may have a kind of government in which they do not believe or which they do not want?
16. Can a country having a king or queen at the head of its government still be a democracy? Why?
17. What changes have taken place in the countries overrun by Germany?
18. Why has the United States more than any other country been a great melting pot for the people of all nations?

TOPICS FOR CLASS DISCUSSION

1. The unity and diversity of nations.
2. Factors affecting the progress of a country.
3. Why the peoples of the world are divided into nations.
4. Influences which tend to bring nations closer together.
5. How the people of the Far East differ from those of the West.
6. The relative importance of size, natural resources, and the character of the people themselves.
7. Kinds of boundaries. Their significance.
8. How national boundaries should be determined.
9. Democracies *versus* dictatorships.
10. Effects of war on social and economic progress.
11. Greater freedom brings greater responsibilities.

WORK TO BE DONE

1. List the countries of each continent. Make two lists for each continent. In the column on the left write the names of those countries which you think are influential in world affairs. On the right those not very influential. Give reasons for choice.
2. On an outline map of the world color in red the chief parts of the

British Empire. Color in green the chief possessions of France. Indicate also the possessions held by the Netherlands, Belgium, and other countries.

3. By what means are colonial possessions obtained? Of what value are they to the mother country?

4. Study a map of Europe as it was before World War I. Another showing boundaries after World War I. Note the important differences. Study a map of Europe showing the parts of Europe overrun by Germany. How do you think the boundaries should be drawn after Germany is defeated?

5. Appoint a committee to study and report to the class on the following topics: censorship; the Atlantic Charter; how a monarchy is governed, a democracy, a totalitarian state.

6. How may lack of unity of thought and purpose within a nation lead to its downfall? Give illustrations if you can.

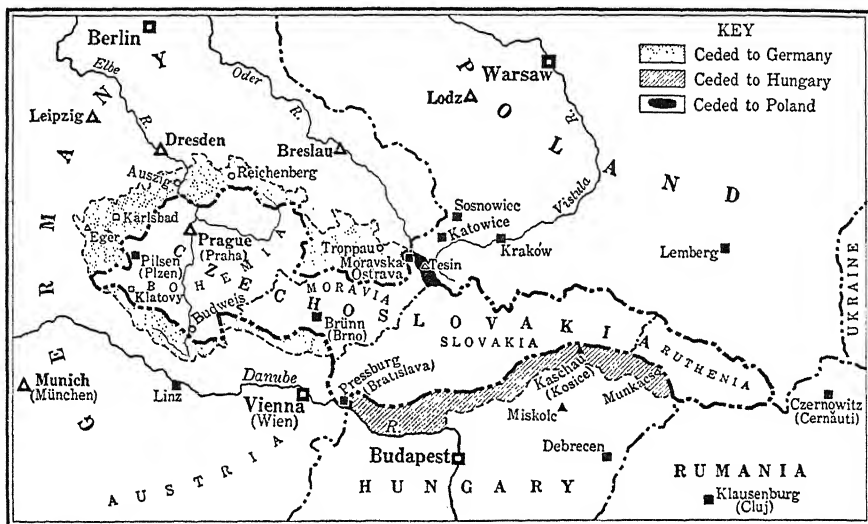
2. THE BEGINNINGS OF WORLD WAR II

The rise of Hitler. For a time following the first World War Germany was governed under a constitution resembling that of the United States. But the pressing economic problems resulting from the war and the new adjustments made necessary by new world relations could not be met speedily by a people inexperienced in self-government. Economic, financial, and political problems brought confusion, great dissatisfaction, and unrest. Experts from the United States were sent to Germany to help the country map out a plan of action and find ways to meet its obligations to other countries. None of these plans was successful.

The unsettled conditions led the people to look for relief from their troubles from whatever source that relief might come. Adolf Hitler, a native of Austria, by promising to cure all their economic and political ills was successful in a comparatively short time in having all the powers of government placed in his hands. Under his rule the people have absolutely no part in government; they have been told how their religious services must be conducted; their business is directed by the State; and their property may be used as the leader, or Fuehrer, directs.

One of the avowed aims of the government is to keep the German race pure and united. This aim has led to a return to German paganism and the adoption of a plan to exclude eventually all other races from German territory. The carrying out of this plan has led to wholesale massacring of Jewish people, to persecution of others of that faith, and to the confiscation of their property.

Invasion begins. The great need of raw materials and of money to finance the government led to the invasion and annexation of



Hitler's first aggressive act was to add Austria to the German Reich in March, 1938. The next blow fell on Czechoslovakia which was compelled in September, 1938, to cede territory, the Sudeten Lands, to Germany and other areas to Poland and Hungary.

Austria and the Sudeten Lands of Czechoslovakia. These regions to be sure were occupied very largely by people of German blood, but they had submitted willingly to the rule of their own countries until aroused by German propaganda. The unrest in Austria and the Sudeten Lands increased and the demands of Germany for the annexation to that country of those areas became more and more insistent. The invasion of Austria by German troops met with no armed opposition by that country, and Austria became a part of the German Reich. To avoid war Czechoslovakia was obliged to cede considerable areas of its territory to Germany. These transfers of territory were made when Czechoslovakia found that it could not count on the support of Great Britain and France, although France and Russia were obligated to aid Czechoslovakia in case of invasion. Russia, however, was not obliged to help Czechoslovakia unless France did.

The acts of the German government toward other races, toward its weaker neighbors, and toward democratic government at home and abroad finally led to war between Germany and those countries, including our own, in which self-government is regarded as a sacred right.

The Europe of World War II. All through what we thought were Europe's peaceful 1930's, feverish preparations for war were

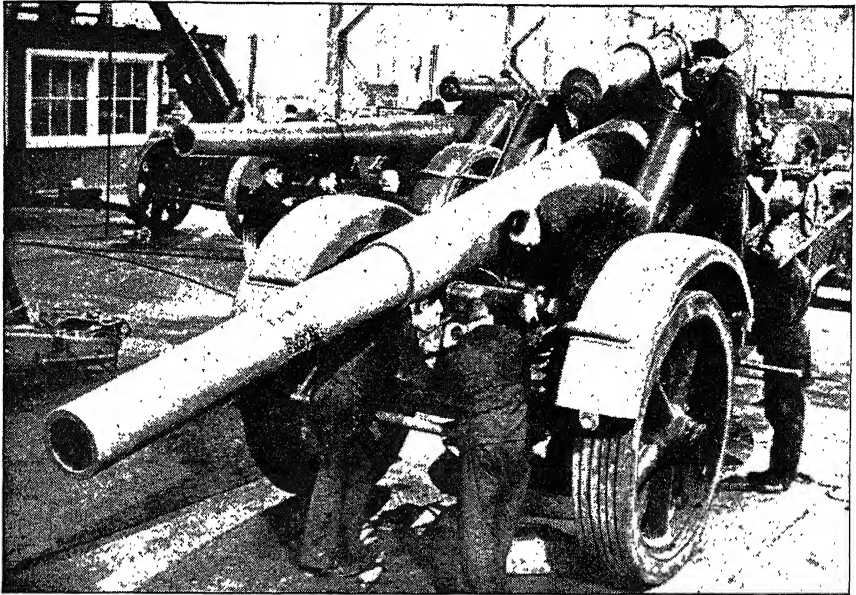


Photo by Deaver from Black Star

A German munitions factory. Heavy field guns are made here. The Germans under the domination of war-mad Hitler prepared ten years for world conquest.

being made at a rate of which we little dreamed. Germany under the domination of war-mad Adolf Hitler was arming for world conquest. Italy, misguided by Mussolini, was arming to increase its limited and poor colonial possessions and by means of threats to gain concessions from France and Britain either for more territory or for greater control of the Mediterranean and the Suez Canal. To the East, Russia, no doubt better informed than others as to Hitler's designs and alarmed as to the possible results, was establishing great arms and munitions factories beyond the Urals where they would be safer from attacks from the west.

In the meantime Japan, later to become an ally of Germany and Italy, with shipload after shipload of scrap iron from the United States was arming itself for war as rapidly as was Germany. This accumulated armament, together with great quantities of gasoline from our own wells, was being stored against the time when Japan would deem it wise to strike against anyone, especially the United States, who dared to stand in the way of its ambitious program to bring all of southeastern Asia under its dominion.

The countries overrun. In 1939 the Germans had taken over the Sudeten Lands of Czechoslovakia and German armored divisions had rolled into Austria and brought that country under the control







of the Reich. After that nearly all continental Europe was brought under German control or German influence. The countries brought under German domination were as follows: Austria, Czechoslovakia, Poland, Denmark, Norway, the Netherlands, Belgium, France, Rumania, Hungary, Bulgaria, Yugoslavia, Greece, and a considerable section of western Russia (including Latvia, Lithuania, and Estonia) and of southwestern Russia. Other countries not occupied but not strong enough to oppose the German will are Sweden, Switzerland, Spain, and Portugal. Even Italy, while allied with Germany, showed itself so weak as to be unable to conquer Greece without German support. After Mussolini's failure to conquer Greece, he was obliged to call into Italy the *Gestapo*, or German military police, to help suppress the many conspiracies to unseat him.

Hitler's success in conquering so large a part of Europe lay in the fact that he was able to work his will on the countries one by one. As one country was attacked or threatened, the others remained passive hoping that they would be lucky enough to escape the German scourge. When England entered the war with the German attack on Poland, the British almost begged the then neutral countries to join Hitler's enemies and thus present a strong united front. Because they would not take this courageous step, they were overrun one by one in the order given. Thus in each instance Hitler had only a weak country to deal with. Furthermore, each country added its resources to Hitler's strength—food, arms, industrial plants, oil, coal, iron, ports for ships, and bases for attacks on England or Russia. By their hesitation these smaller and weaker countries played into Hitler's hands and made his first overwhelming successes possible.

Various means have been used to bring all these countries under German domination. On the whole, up to the time of the invasion of Russia, there had been little fighting. In some countries, as in Austria, there were many Germans who for years had worked for annexation to the Reich. To all countries German agents had been sent to stir up strife and to make difficult united opposition to invasion. These agents, known as *fifth columnists*, obtained all the information possible and, when invasion came, did much to make the final attack a success.

Again, Germany was prepared for war on a scale almost undreamed of. For eight years practically all the resources and the manpower of the country had been devoted to the manufacture of the implements of war and to the training of men in the use of airplanes, tanks, parachutes, and submarines. So great were the sacri-

BELLIGERENT MANPOWER AND RESOURCES

	ANTI - AXIS BELLIGERENTS (INCLUDING FRIENDLY AREAS)	AXIS BELLIGERENTS (INCLUDING DOMINATED AND FRIENDLY AREAS)
	39,621,000	3,082,000
	1,469,647,000	521,505,000
	69%	21%
	86%	3%
	67%	29%
	64%	27%
PRODUCTION FIGURES DO NOT INCLUDE AREAS OF LESS THAN 1 % OF TOTAL		

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fices demanded of the German people in the long preparation for the conflict that the leaders told them that it was a choice between "guns and butter." Large supplies of gasoline, raw materials, munitions of all kinds, and food supplies were stored for use when hostilities started.

One of the phases of German warfare responsible perhaps more than any other for their military successes was the *Blitzkrieg* (lightning war), a sudden and violent drive with tanks *through* the enemy's line and a blistering attack with airplanes *behind* the enemy's line. At the same time hundreds, if not thousands, of German soldiers

often in the uniform of their enemy were dropped from parachutes within enemy territory where they did much to prepare the way for the invading armies.

Not a few of the invaded countries hastened to come to terms when only a show of German force had been made. Country after country was brought within the sphere of German influence or under German domination without the firing of a single shot. Others signed treaties by which they bound themselves not to take sides against Germany.

A world menace. In view of the rapid advance made by the Axis Powers, especially Germany, the rest of the world had come to look upon the ambitions of the Berlin-Rome-Tokyo Axis as a real threat to foreign trade, to ownership of territory and resources, and even to political and religious freedom. Germany's greatest ambition is no doubt the defeat of Britain. With such defeat there would certainly follow German control of British colonies. Some of these colonies are neighbors to the Americas, and Axis claims would conflict with our Monroe Doctrine.

The British blockade. One of the methods employed by Britain—and by France before the defeat of that country—was to prevent in so far as possible any trade between Germany and other countries. Since Britain could not prevent German trade by overland routes, it made use of its large navy to prevent nearly all German trade by sea. One by one as countries bordering the Atlantic were overcome by Germany, their ports were also blockaded by Britain. The study of European countries today consists quite largely in trying to understand the conditions in those countries resulting from German domination together with the hardships resulting from the British blockade.

Russia attacked. On June 22, 1941, Germany attacked Russia. Previous to this time Germany and Russia had apparently been on very friendly terms. Representatives from Russia had visited the German capital and representatives from Germany had visited the Russian capital. Reports of understandings between the two countries gave the impression that Germany had nothing to fear from Russia and caused the rest of the world to fear that Stalin might even come to Hitler's aid. On the Russian side such understandings gave Russia time to prepare for the conflict which Stalin knew was bound to come. Such a delay proved to be a great boon to Russia. It enabled that country to resist German invasion as few people thought possible. Indeed Hitler himself has declared that the Germans were



unaware of the extensive preparations which Russia had made in anticipation of just such an attack.

The Allies and the Axis Powers. England declared war on Germany when Poland was attacked in September, 1939. France soon joined England. The countries fighting Germany and Italy are commonly known as the *Allies*. Italy remained neutral until the fall of France was clearly evident; then it entered the war on the side of Germany. From the beginning of hostilities the interests of Japan have coincided with those of Germany and Italy. These three were known as the *Axis Powers*. The group was usually referred to as the *Berlin-Rome-Tokyo Axis*.

These three countries which sought to extend their territories and their hold on world resources and world trade are often referred to as

have-not nations as compared with the United States, Britain, France, and Russia which possess much greater resources and in the case of Britain and France many colonies scattered over the world.

GUIDES TO STUDY

1. Why was a democratic form of government not successful in Germany following World War I?
2. Describe the government set up by Hitler. Why did Hitler undertake the invasion of other countries?
3. What preparations for World War II were made by the Axis Powers? Why did they expect to gain by the use of force?
4. What countries were brought either wholly or in part under German control? How was Hitler able to gain control of those countries with so little fighting?
5. Why do the democracies look upon the Axis Powers as a world menace?
6. What was the purpose of the British blockade?
7. What had Hitler to gain by attacking Russia? What resources does Russia possess that would be of value to Germany?
8. When did Britain enter the war? What event brought the United States into the war?
9. Why are dictatorships greater sources of danger to the peace and well-being of the world than are democracies?
10. How has geographic position helped Germany carry out its program of aggression? Compare its location with that of its former ally, Italy.
11. How does the annexation of territory increase the manufacturing possibilities of a country? Illustrate by means of Germany; Japan.

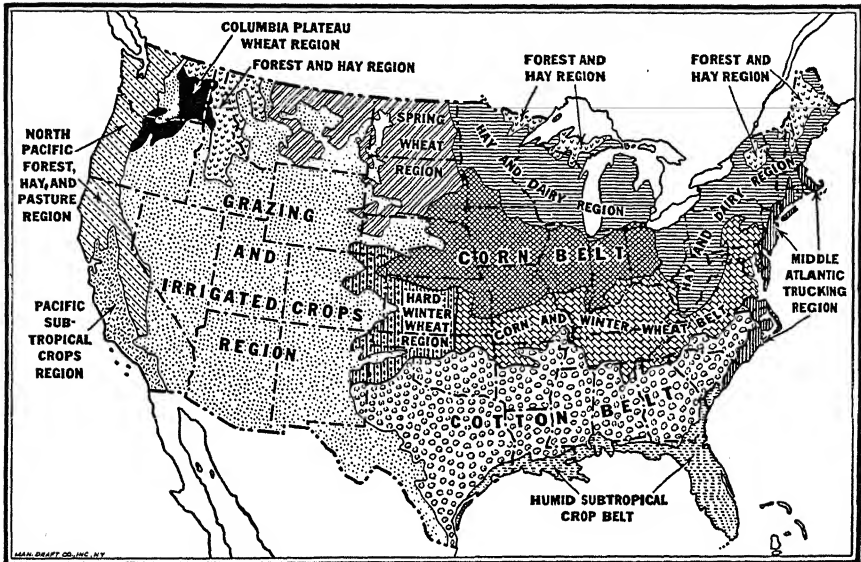
TOPICS FOR CLASS DISCUSSION

1. Germany under Hitler.
2. The overrun countries under Hitler.
3. The free countries of Europe, that is, those not under German control.
4. Europe after World War I.
5. Italy's aims and its part in the war.
6. What Japan has accomplished.
7. The advantage of the Axis Powers in working together.
8. Countries opposing the Axis Powers.
9. The most important factors that make a nation strong.
10. A nation that desires peace should have considerable military strength.

WORK TO BE DONE

1. Turn to the units of this text on Europe and learn what resources and advantages Hitler has gained by occupying the conquered countries of that continent.
2. Make a study of the resources of Italy and find out why it was of so little use to the Axis.
3. Compare the colonial possessions and resources of the *have* nations with those of the *have-not* nations.

PART TWO. THE UNITED STATES IN A GLOBAL WAR



The agricultural and grazing regions of the United States. What does the map tell of the climates of the different sections of the country?

UNIT VII . THE ECONOMIC STRENGTH OF OUR COUNTRY

I. PLACE OF THE UNITED STATES IN THE WAR

Place among the nations. The United States holds the leading position among the United Nations. All the others look to the United States for leadership and assistance against the attacks and threats of aggressors now and in the future. The leading industrial and military position which the United States occupies among the United Nations places upon us grave responsibilities.

World relations. Notwithstanding our supposed separation from the Old World our interests extend to every corner of the globe. In times of peace there is no other country with which we do not trade. Furthermore, American citizens had funds invested in all leading producing and consuming areas. Manufacturers of automobiles, farm machinery, sewing machines, office equipment, and oil companies had offices in nearly all countries. Railroads, mines, and plantations in

DECLARATION BY UNITED NATIONS

A JOINT DECLARATION BY THE UNITED STATES OF AMERICA, THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND, THE UNION OF SOVIET SOCIALIST REPUBLICS, CHINA, AUSTRALIA, BELGIUM, CANADA, COSTA RICA, CUBA, CZECHOSLOVAKIA, DOMINICAN REPUBLIC, EL SALVADOR, GREECE, GUATEMALA, HAITI, HONDURAS, INDIA, LUXEMBOURG, NETHERLANDS, NEW ZEALAND, NICARAGUA, NORWAY, PANAMA, POLAND, SOUTH AFRICA, YUGOSLAVIA.

The Governments signatory hereto,

Having subscribed to a common program of purposes and principles embodied in the Joint Declaration of the President of the United States of America and the Prime Minister of the United Kingdom of Great Britain and Northern Ireland dated August 14, 1941, known as the Atlantic Charter,

Being convinced that complete victory over their enemies is essential to defend life, liberty, independence and religious freedom, and to preserve human rights and justice in their own lands as well as in other lands, and that they are now engaged in a common struggle against savage and brutal forces seeking to subjugate the world, DECLARE:

(1) Each Government pledges itself to employ its full resources, military or economic, against those members of the Tripartite Pact and its adherents with which such government is at war.

(2) Each Government pledges itself to coöperate with the Governments signatory hereto and not to make a separate armistice or peace with the enemies.

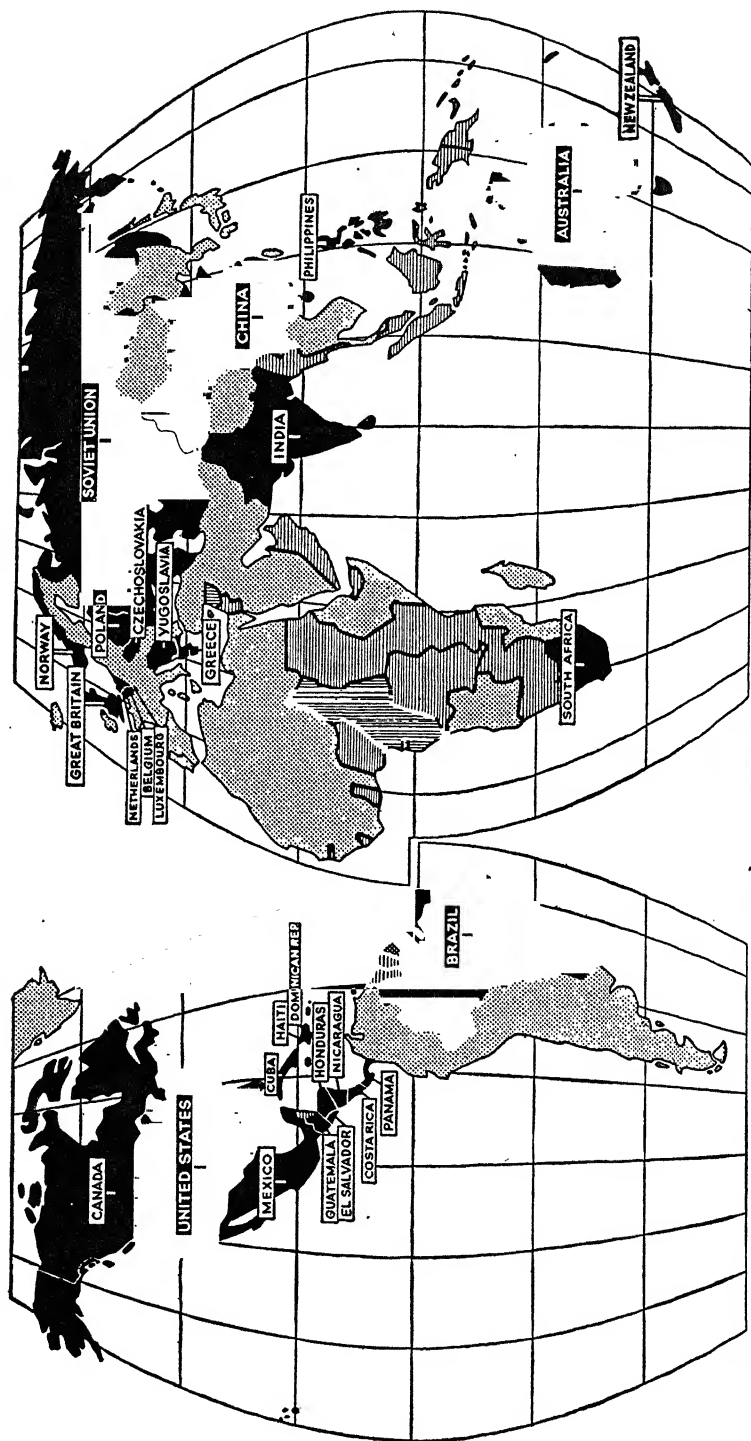
The foregoing declaration may be adhered to by other nations which are, or which may be, rendering material assistance and contributions in the struggle for victory over Hitlerism.

Done at Washington,

January First, 1942.

(Here follow the signatures of the President of the United States, the British Prime Minister, the Soviet Ambassador, the Chinese Foreign Minister, and the representatives of the other nations set forth above.)

THE UNITED NATIONS



AS OF SEPT. 1942

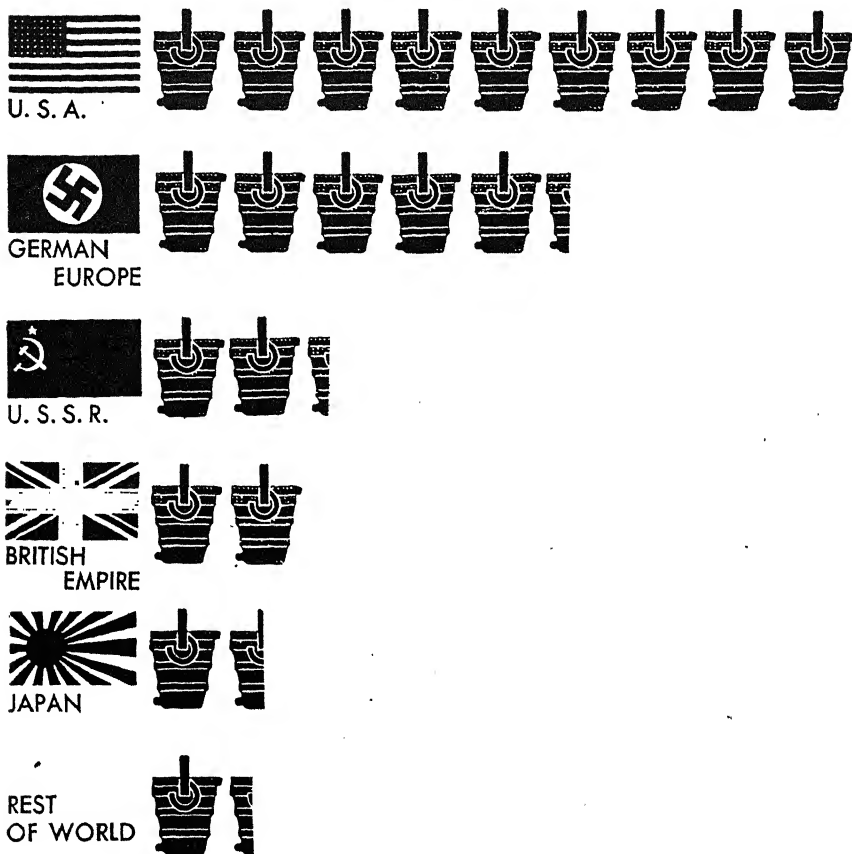
UNITED NATIONS

THEIR POSSESSIONS & MANDATES

FIGHTING FRENCH TERRITORY

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HOW MUCH STEEL CAN WE PRODUCE?



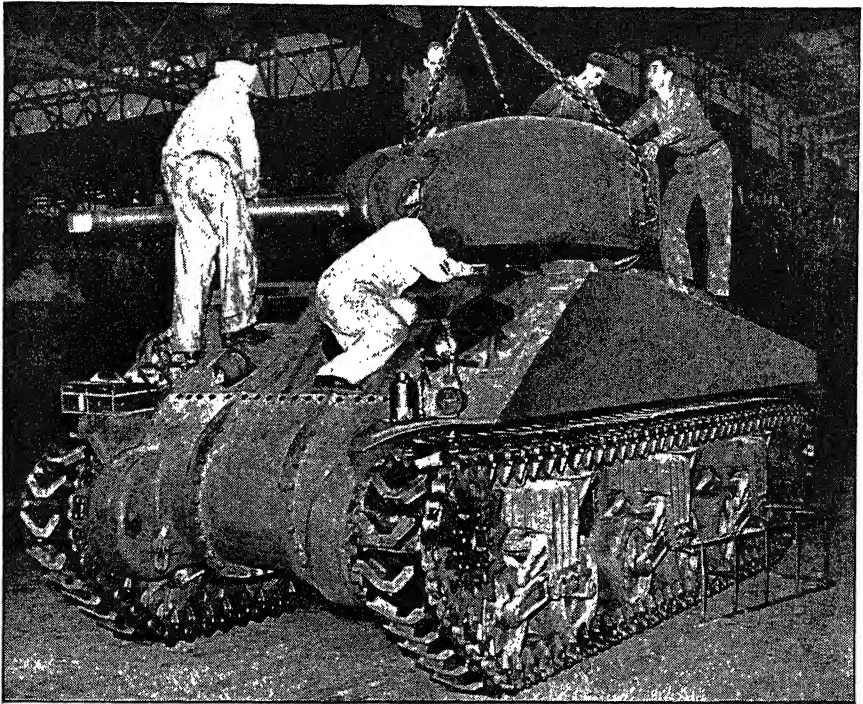
Each ladle represents 10 million tons of ingot capacity

Pictograph Corporation for "The New York Times"

This diagram shows the quantity of steel the United States can produce as compared with other countries. Our ability to produce steel is one of the chief reasons for our prosperity in peace and for our strength in times of war.

all the continents were owned and operated by Americans. In addition to these, purchasing agents for American companies were widely scattered throughout the world.

Beginning with the Spanish-American War, our world-wide interests increased. About that time we acquired the Hawaiian Islands, the Philippines, and Puerto Rico. Hawaii voluntarily joined the United States in 1898, and the Philippines and Puerto Rico were surrendered by Spain. Possession of a number of small islands in the Pacific added to our interest in that part of the world.

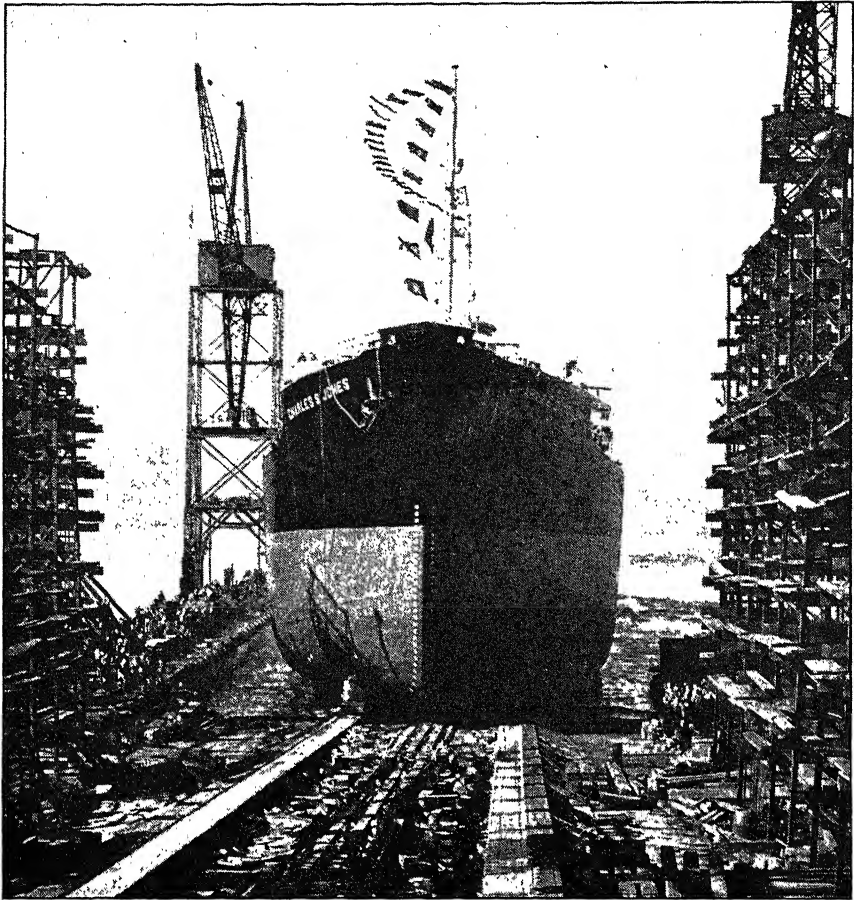


Courtesy Chrysler Corporation

Lowering a massive five-ton turret and heavy gun on an M-4 tank in a Detroit tank arsenal. This is one of the last operations in the construction of a tank.

Our economic strength. The United States holds a place of great influence in world affairs because of its economic strength. It stands among the very first in the extent of agricultural lands producing wheat, corn, cotton, and meats. Its reserves and annual production of coal and iron are greater than those of any other country. Its forest reserves are still large although they are being rapidly reduced. The fisheries of all the coasts and of the Great Lakes make a most valuable addition to its food supply.

Not only has our country this great wealth of resources, but what is of equal importance, all these resources have been well developed. Agricultural machines have been invented to cultivate our lands extensively and in some parts of the country very intensively. In no other country have inventions and improvements in the processes of mining and manufacturing been so numerous as in the United States. By means of the assembly line, developed in this country, in times of peace we turn out automobiles, trucks, tractors, and machines of all kinds at a rate almost unbelievable. With the coming of lend-lease and the attack on Pearl Harbor, all the great manufacturing

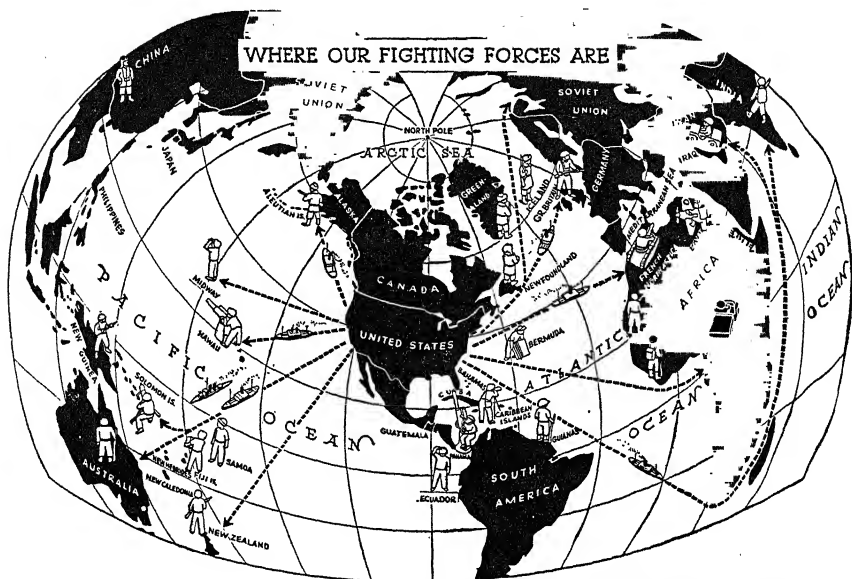


Courtesy Bethlehem Steel Co.

The United States shipyards are turning out on the average six of these merchant ships every day. The shape of the hull shows that the ship is built not for speed but to carry large cargoes. Such ships in convoy are carrying supplies to our men in the service, lend-lease goods to our allies, and food to the people freed from German control. This ship is being launched at Sparrows Point near Baltimore.

plants of the country were in an incredibly short time turned over to the making of planes, tanks, jeeps, guns, and ammunition. At an equal rate our shipyards were enlarged and speeded up to turn out merchant ships and naval vessels of all kinds.

Military strength. In times of peace our armed forces, as compared with those of other great powers had been very small indeed. We felt that we had the Atlantic on the east, the Pacific on the west, and neighboring countries from whom we had nothing to fear on the north and the south. Therefore, under normal conditions we had little need of large armaments. But times of peace can change rather suddenly to times of war. It takes many months to build



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factories for planes, guns, tanks, and munitions and shipyards for millions of tons of shipping, and to select a large number of men and train and equip them for actual warfare. It is here again, however, that our economic strength comes to our aid. Our manufacturing plants, our railroads, our communication lines, and our agricultural and forest resources are adapted in a short time to the equipment and transportation of large numbers of service men on the land, on the seas, and in the air.

Naval strength. Because our need of defense has supposedly been largely along our coasts, we have maintained a fleet of naval vessels comparable to those of the strongest powers. By means of ships and aircraft we felt we could defend our own shores and at the same time defend our possessions. But this proved to be an error. In case of war far from our own shores merchant ships are necessary to transport troops, provisions, and equipment to the theater of war. For many years our merchant fleet had not been large. During World War I we were largely dependent upon Britain for carrying men and supplies. Our great resources and highly developed industries make it possible, however, to enlarge our shipyards and build both merchant and naval vessels in large numbers. We have been fortunate indeed in the present war to have allies much better prepared than ourselves who were able to ward off the enemy while we were recruiting an army and streamlining our industries. It was well too that our

allies for many months had been purchasing arms and ammunition from our manufacturing plants, thus turning their facilities away from peacetime needs and toward those of war. Our lend-lease agreement with our allies whereby we arranged to supply them with arms and ammunition also prepared our manufacturing plants for active participation in the conflict.

Thus we see that our might as a fighting nation, except for the strength of our navy, lay dormant until we were aroused by attack. Our country has no desire to acquire or control new territory. For this reason there must arise a pressing need for defense to bring forth its full fighting strength.

Air strength. Our air strength is, of course, a military secret. We know that wherever our fighting men are, they have fighter and bomber planes to use offensively and defensively. Our automobile factories have been expanded to produce an ever-increasing volume of air strength. General Marshall reported that we had sent 3000 planes to our ally Russia. No doubt thousands of Liberators and Flying Fortresses are based in Britain for the almost daily bombing of German military targets and similar bombings have taken place from airfields in Italy which are now in the hands of the Allies and are well located for attacking southern Germany.

GUIDES TO STUDY

1. Why do other nations look to the United States for leadership?
2. As a leader what responsibilities fall to us?
3. In what ways are we related to other nations?
4. What factors help to make us strong?
5. What has been true of our military strength?
6. Why is our air strength a military secret?

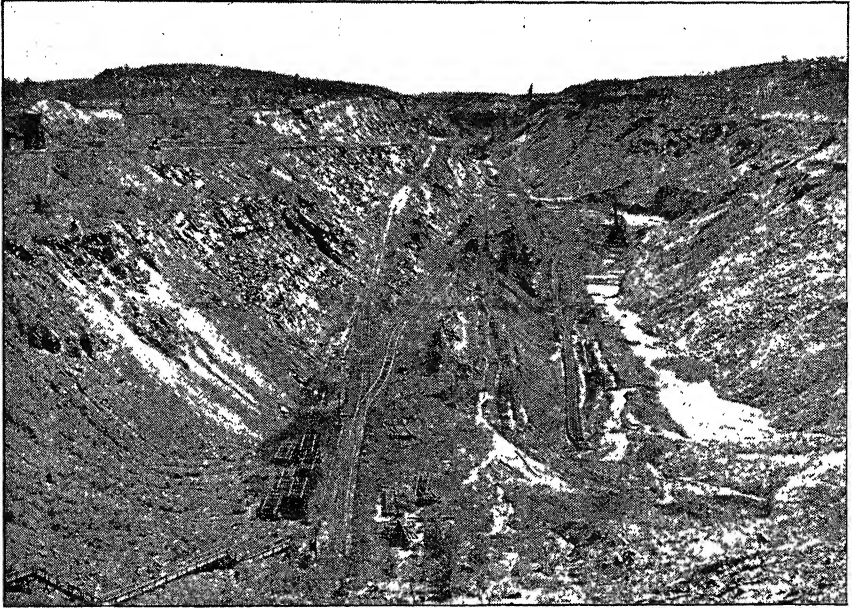
TOPICS FOR CLASS DISCUSSION

1. How aviation has served to set all the world's problems on our own back doorstep. How far away are the diseases of the Orient as measured in flying time?
2. The Atlantic Charter and its purposes.

WORK TO BE DONE

1. Learn what nations are now either members of the United Nations or are associated with them.
2. Which ones were not original signers of the agreement?
3. Learn all you can of the Moscow agreement, the participating countries, and their representatives.

2. RESOURCES—THE FOUNDATION OF OUR STRENGTH

*Photo by James Sawders*

Open-pit iron mines in Michigan. Nature has been very generous in providing our country with great deposits of iron ore, many of them near the surface where the ore can be easily removed with steam shovels.

The basis of our national wealth. Our country started from very small beginnings. Its area gradually increased from a narrow strip along the Atlantic Coast to its present size. The people pushed farther and farther west till all unknown lands were explored and their resources discovered. Farm lands were cultivated, mines were opened, and forests were invaded. Great industries were established, transportation lines were laid, and great cities were built. The growth of the country has been truly marvelous. Our people were fortunate in possessing a land whose vast wealth of resources plus the initiative of a free people under a democratic government has made possible the development of a great country.

ADVANTAGES FOR COMMERCIAL DEVELOPMENT

A healthful and invigorating climate. Climate is one of the most important factors in man's environment. The tropics are too hot and the polar areas are too cold for the best development of man's activities. Desert areas furnish almost no raw materials and



Courtesy Caterpillar Tractor Company

Irrigating a grove of orange trees in Southern California. In this region rain falls only in the winter; for this reason irrigation is necessary. The water comes from mountains where often the source is the melting of snow which fell the preceding winter.

few if any products to support human life. Regions of excessive rainfall are often unhealthful. The continental United States offers climate of great variety, but a variety without great extremes. In the northernmost section, as in Minnesota or New England, the cold is sufficient to keep the ground frozen throughout the winter. In the southern section, as in lower Florida and southern California, the winters are without frost. In the eastern section of our country the rainfall is sufficient for the growth of crops that support the life of man and domestic animals. West of the hundredth meridian and east of the Sierra Nevada and Cascade Ranges the rainfall is so scant that the farmer must depend either upon irrigation or upon dry farming. Irrigation is extensively used in parts of California, but much of the Pacific Coast has an abundant rainfall. This variation in temperature, length of growing season, and rainfall accounts for the diversity of plant and animal life in the various sections and likewise explains the difference in occupations, industries, and commercial activities.

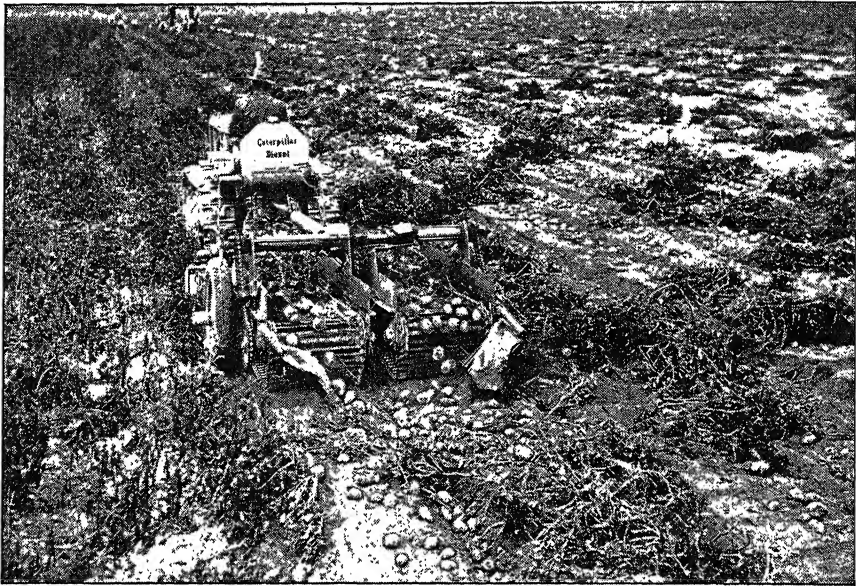
Training our soldiers for a global war. Our service men must

*Signal Corps Photo*

Shelters for American troops in Iceland

fight in the steaming jungles of the Southwest Pacific, on the desert sands of North Africa, and in the ice and snow of the Aleutians or the winter climates of Alaska and Iceland. Fortunately we have in our country all types of climate for training our men for whatever part of the world they may be sent to. In Louisiana and Mississippi they train for tropical jungles; in the deserts of Arizona and New Mexico for the heat and aridity of the Sahara; in the northern Rockies at all seasons there is snow for training ski troops and incidentally rugged mountain heights on which they prepare for scaling vertical cliffs, such as were found in Tunisia. The hot summers of our Southern States and the cold of our northern winters offer opportunities for the service man to adapt himself to many of the extremes of latitude and altitude to which he may be subjected.

A country of great size. Our country, roughly rectangular in shape, extends from east to west for a distance of about 3000 miles and from north to south for a distance of about 1500 miles. From this area could be carved forty-five states the size of New England with enough left over for an additional Maine and Connecticut. It is more than three times as large as it was when the original thirteen



Courtesy Caterpillar Tractor Company

A large potato field in Colorado. Digging potatoes by machine makes possible the cultivation of the large acreages that are devoted to this popular product. Maine leads all other states in the production of potatoes. Other states having high yields are New York, Idaho, and Pennsylvania.

states established our government. The population today is more than thirty times as great as it was when the first census was taken in 1790.

Our favorable location. The narrow Atlantic lies between our eastern seaboard and western Europe which in peacetime is the best commercial market in the world. The interchange of products—agricultural, mineral, and industrial—between eastern United States and western Europe employs normally millions of workers in production, distribution, and transportation of these commodities. That interchange furnished a large part of the revenue formerly enjoyed by our railroads and other forms of land transportation and by our steamships. The Pacific lies between our western coast and Asia where there are large opportunities for the development of commerce such as our Atlantic Coast enjoys. On both coasts fine harbors furnish safe anchorage for ships and abundant facilities for loading and unloading cargoes.

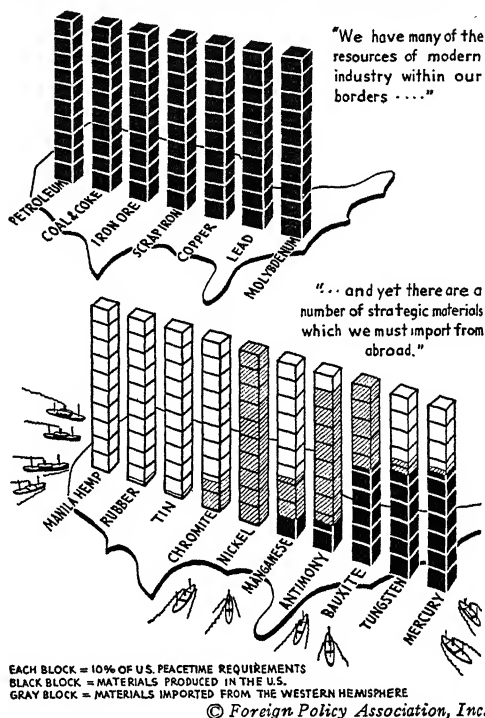
Wealth of productive land. The American farmer has been abundantly blessed in having rich virgin soil on which to produce crops to sustain himself and to sell for the support of our industrial population. In various sections of the country the soil and the

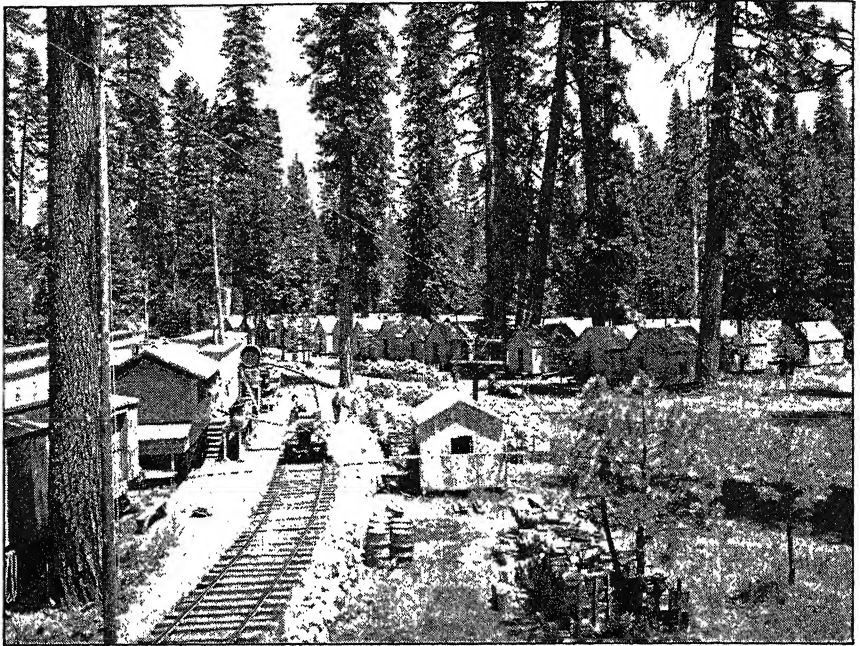
climate are adapted to the production of most of the products that are grown anywhere else in the world with the exception of a few plants that grow only in the tropics. Most of the farms are on level or slightly rolling land and are so extensive as to permit the use of modern agricultural power - drawn machinery. Thus the quantity of production per man is greatly increased. This is in striking contrast to the small farms of western and southern Europe and of eastern Asia where a very large part of the farm work is done by hand.

Abundant mineral wealth.

Our country ranks first among the nations in the production of many of the most useful minerals, such as coal, iron, copper, and petroleum. All these are essential to an industrial nation, and it is a great advantage to have access to large deposits of these minerals instead of having to import them from other countries. Much of the unrest in the world is due to the unequal distribution of these necessary raw materials. The countries that do not have them covet lands in which they may be produced. Before World War II our production of pig iron was more than one third as much as the combined production of four of the large-producing countries of Europe; namely, Germany, Russia, Great Britain, and France. For many years our production of copper was greater than the combined production of all other producing countries in the world. However, owing to increased production elsewhere in very recent years, the United States is now producing only about one third of the annual production of this metal. Our production of petroleum is about 60 per cent of the total produced by all countries. Our petroleum reserves are greater than the known reserves of the rest of the world.

OUR INDUSTRIAL STRENGTH





Courtesy Caterpillar Tractor Company

A lumber camp in California. The foundation of the roads and railroads is quickly and easily prepared with the use of Diesel tractors. Note the long trunks of the trees without branches which serve to make excellent lumber.

Our forest resources. When the white man came to this country, he found great forests of hard and soft woods from what is now Maine south along the entire eastern section of this land and throughout what we now call our Southern States. These forests have been cut down to make way for farms and to produce lumber for building, and many of them too have been destroyed by fires. Up to a generation ago few people realized that we would eventually be faced by a shortage of lumber or that its price would be greatly increased by the distance that it would have to be hauled as the eastern forests were destroyed. While our Southern States are still abundantly supplied with timber, a large part of the lumber that we need must be shipped from our western forests. Only comparatively recently have the people realized how destructively our forests have been treated and how necessary conservation of this gift of nature must become. The Government and lumber-producing companies are devoting great sums of money to reforestation of cut-over or burnt-over lands.

Abundant power resources. Coal, petroleum, and water power have all contributed enormously to American industrial development.



The United States has spent enormous sums of money in developing our water-power resources, combining with their development flood control, the conservation of soil, irrigation, and the navigation of inland waterways. Improved methods of using coal and petroleum in the production of power have made possible conservation of these two important but diminishing resources. Without the energy developed from these three sources—coal, petroleum, and water power—our country would never have become a leader as an industrial nation.

NATURAL REGIONS AND THEIR RESOURCES

The United States consists of five great natural regions as determined by relief, or the elevation, of the surface of the land areas. Each one of these divisions is characterized by products and occupations which are largely determined by the nature of the region. These five areas are: (1) the Atlantic and Gulf Coastal Plain; (2) the Appalachian Highland; (3) the Interior Plains; (4) the Rocky Mountains and Intermontane Plateaus; and (5) the Pacific Highlands and Lowlands.

The Atlantic and Gulf Coastal Plain. From the map (p. 169) note how extensive this region is. Its area is about one tenth of that of the entire country. It is extremely narrow in the north and gradually expands as it extends southward until it includes the entire state of Florida and the southern part of the states directly north of Florida; then it swings northward to include western Kentucky and Tennessee and a large part of the drainage area of the lower Mississippi, as well as the lower courses of the Texas rivers that flow southeastward to the Gulf. This Coastal Plain was once submerged and a great part of it today is characterized by sandy soil. Such soil is not naturally of high fertility but can be made highly productive by the use of fertilizers. Since it was once the floor of the ocean, there are few elevations. It is easy to build highways through it, and the farmers can make large use of agricultural machinery. In certain sections of it there are swamps, but much of this swampland has been drained and turned into large acreages of fertile farm lands. In the northern area, especially on Long Island, in New Jersey, and farther south, truck gardening is the important occupation of the farmer. By use of fertilizers two crops or more a year are often secured from the same land and proximity to the great industrial centers affords a market for all the foodstuffs that can be produced.

*Photo by James Sawders*

A wayside stand in New Jersey on a main highway. When motorists are free to drive when and where they please, they are excellent customers for outdoor markets like this.

From these truck gardens hundreds of carloads and truckloads of vegetables are brought into New York and other cities of the metropolitan area to feed the workers in the offices, stores, and factories of this section with its dense population. Farther south in Virginia and North Carolina truck gardening is less important, but large crops of fruits, cereals, and peanuts, as well as tobacco, are grown. The great cotton crop of our Southern States is produced largely on the Coastal Plain. The rice fields of Texas, Louisiana, and Arkansas are entirely in this region as are the sugar-cane plantations of Louisiana. All the oranges, grapefruits, and other fruits and vegetables of Florida are products of this region. In the Lower Rio Grande Valley of Texas a great citrus-fruit and vegetable industry has grown up. By means of rapid transportation fruits and vegetables reach the cities of the North and the East only a few hours after they are taken from the truck garden, field, orchard, or grove, and as a result these necessary foods can be found in the city markets the year around. In certain sections of the Coastal Plain the soil is particularly adapted to the growth of pine trees, which are valuable for lumber, paper, and naval stores. In swamp areas the cypress tree grows luxuriantly and from it are sawed millions of feet of choice lumber annually.

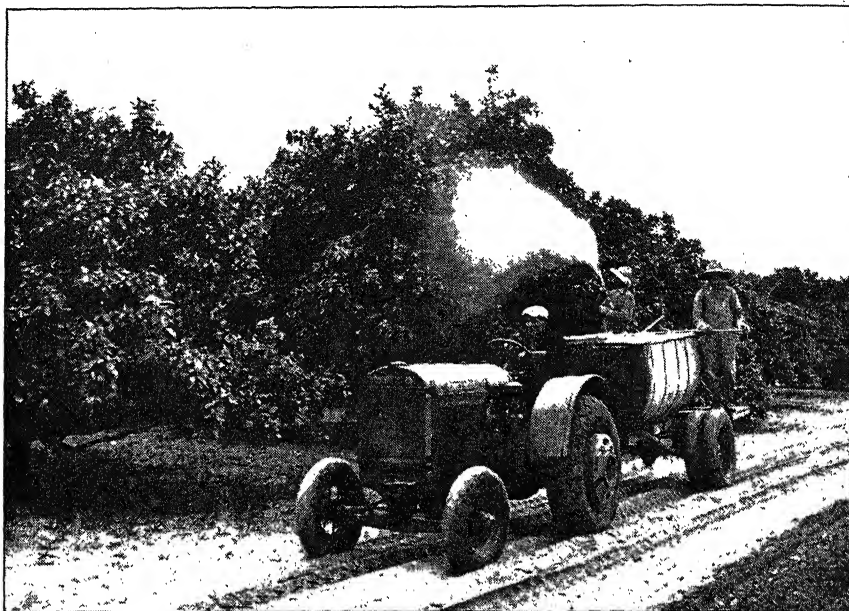


Photo by James Sawders

Spraying orange trees in central Florida to prevent rust. Raising fruit means more than simply picking it from the trees. The grower must care for the trees several years before they are large enough to bear fruit. Then he must guard against plant diseases, insects, and frosts.

Other useful and valuable soft and hard woods also are found in forested areas.

In the Gulf Coastal Plain are mineral deposits of great value. A very important and cheap fertilizer is obtained from the phosphate rock which is abundant in Florida. Huge beds of sulphur are found in Texas and Louisiana. Great underground reservoirs of oil exist in Texas, Louisiana, and Arkansas, and the rich flow from these pools is largely responsible for our country's being the world's leading producer of petroleum and petroleum products.

The Appalachian Highland. West of the Atlantic Coastal Plain is a hill country, the eastern part of which was once a high and rugged mountain region. It extends from New York State to Alabama. This highland region is made up of three distinct parts: (1) the Piedmont Plateau on the east; (2) the Appalachian Plateaus on the west; (3) the Great Valley and the Blue Ridge in between. The Great Valley is also known as the *Appalachian Ridge and Valley Region*.

The Piedmont. This plateau lies between the Coastal Plain and the Blue Ridge. The soil is deep and rich and the surface fairly

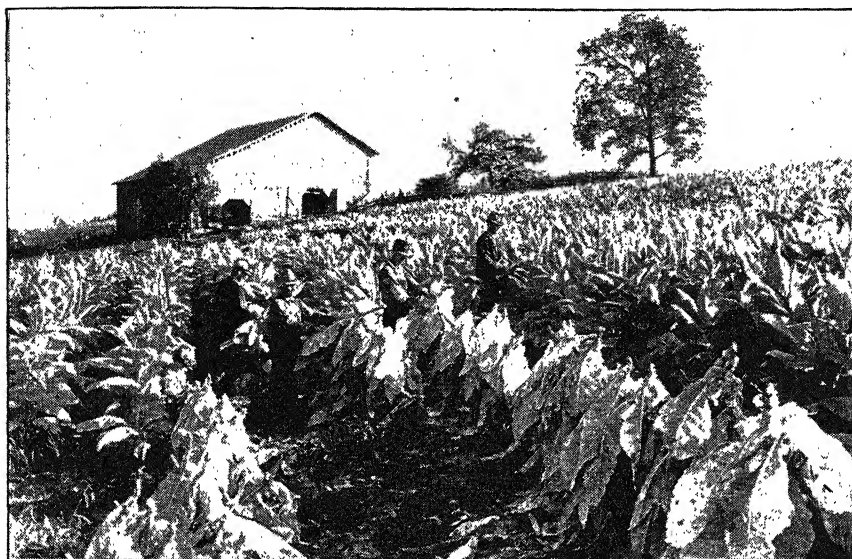


Photo by James Saunders

Cutting tobacco in the Piedmont section of Virginia. The drying sheds are seen in the background.

level. On account of its favorable climate it is a noted agricultural area and productive of many kinds of crops. In the north apples, tobacco, and dairy products are abundantly produced. Much wheat and corn are also grown. In the southern part cotton is the important crop.

The Fall Line. Just west of the Coastal Plain soil and surface changes become noticeable. Here the streams pass from the sedimentary rocks of the old mountains to the softer clays and sands of the Coastal Plain. The rivers flowing from the Piedmont have carried away the soft materials and have deposited them as clay or sand on the level surface of the plain or have carried them into the ocean. Because the underlying structure is rock, falls have been developed along the contact between the Piedmont and the Coastal Plain. These falls mark the head of navigation on the rivers and furnish water power that is being used in factories located in the cities that have grown up along the Fall Line. Trace the Fall Line on the map (*Pl. 2*),* and you will find such cities located there as Richmond in Virginia, Raleigh in North Carolina, Columbia in South Carolina, and Augusta and Macon in Georgia. Such falls are not confined to the Fall Line but may be found throughout the Piedmont section, affording many sites for the development of water power. This

* *Pl. 2* refers to the second colored map in the Appendix.

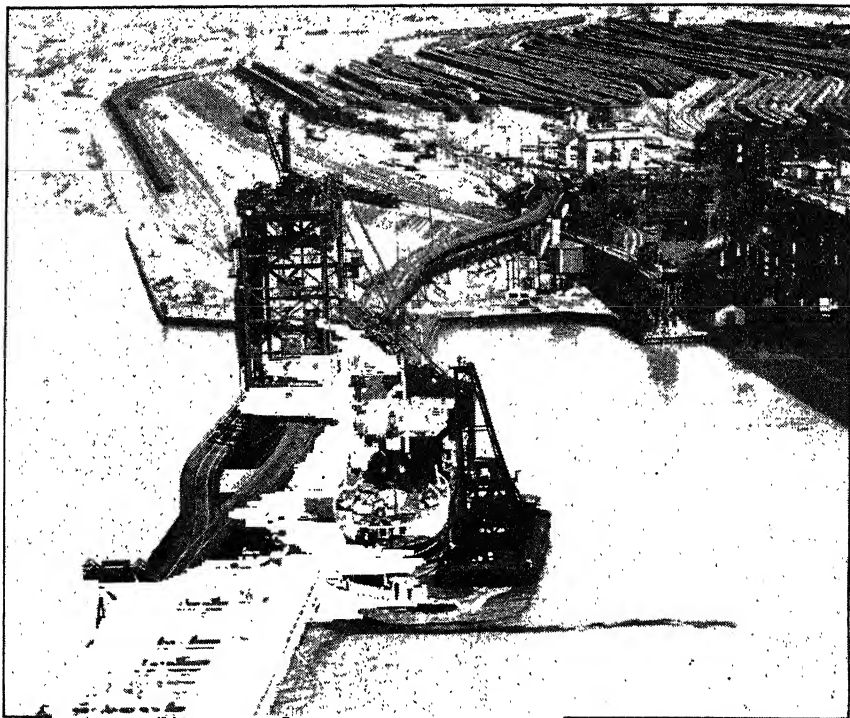


Photo from Keystone View Co.

The coal pier of the Norfolk and Western Railroad at Norfolk, Virginia

accounts for the location of many of the cotton mills and other industries that are found in the Piedmont.

The Appalachian Plateaus. In the western part of the Appalachian Highland are the Appalachian Plateaus including Allegheny and Cumberland Plateaus. The plateau section includes the Catskills in New York and extends southward to northern Alabama. In this region are vast deposits of bituminous coal, especially in western Pennsylvania, West Virginia, eastern Kentucky, and eastern Ohio. Iron ore, petroleum, and natural gas occur in limited quantities. The ridges and mountains are still covered with hardwood forests from which much valuable timber is cut. The excellent farm lands produce grains, livestock, fruits, and vegetables.

The Great Valley and the Blue Ridge. West of the Piedmont is the Blue Ridge, a range reaching from near Harpers Ferry, West Virginia, to northern Georgia. Two great national parks are included in this area—the Shenandoah National Park in northwestern Virginia and the Great Smoky Mountains National Park in North Carolina and Tennessee. Just west of the Blue Ridge lies the Great

*Photo by James Sawyers*

The Skyline Drive along the crest of the Blue Ridge in Virginia

Valley of the Appalachian Highland. It extends from the St. Lawrence Valley to central Alabama—a distance of more than 1000 miles. Its width varies from twenty-five to sixty-five miles. It is really a series of many small valleys separated from each other by low ridges that run lengthwise of the Great Valley. Dissected as it is by ridges and streams, individual names are given to various parts of this region. Many rivers drain the Valley, as the Delaware, Susquehanna, Lehigh, Potomac, James, Shenandoah, Roanoke, New, Holston, and the Tennessee. Hence, in northeastern Pennsylvania there is the Lehigh Valley; Lebanon and Cumberland Valleys lie near the Susquehanna River; in northern Virginia is the Shenandoah Valley, or the Valley of Virginia; and farther south are the East Tennessee Valleys—all parts of the Great Valley.

Many highways and railroads traverse this region, following its use generations ago by the pioneers seeking the frontier in their covered wagons. Naturally the road builders and railroad engineers followed the paths blazed by the migrants to the West. Prosperous towns have developed throughout this region where raw materials for manufacture and power resources are abundant. However, farming has always been the leading occupation due largely to the rich

limestone soil and favorable climatic conditions. Fields of wheat, corn, and clover, with many an orchard of apples and other fruits, afford a magnificent panorama. Mineral wealth also abounds. In Pennsylvania are rich stores of anthracite and farther south bituminous coal is abundant. In northern Alabama the nearness of coal fields, iron-ore mines, and limestone has made Birmingham one of the most important iron and steel centers of the country. The city has become an important railroad center also with nine important systems furnishing transportation facilities. Limestone throughout this region is an important highway-building material, and great quantities are also used to produce lime, cement, and fertilizers. From the abundant clays brick, tiles, pipes, and other clay products are manufactured in many places.

The forests of pine, spruce, and other evergreen trees on the ridges still produce much marketable lumber but excessive cutting has greatly lessened the quantity produced. A variety of hardwoods grow on the ridges and in the valleys. Manufacturing industries other than those mentioned have been attracted to the towns and cities of the Great Valley because of the proximity of raw materials and an abundant labor supply. There they also found a lower cost of living for workers, less industrial strife, access to cheap power, and lower taxes. Such conditions brought an increasing number of industries, especially textile-manufacturing plants, to the southern part of this region. There workers can grow much of their own food and yet have an income from their wages paid by a mill or factory.

New England. The mountains of New England may be considered a northward extension of the mountains of the Appalachian Highland. The southern and eastern uplands of New England strikingly resemble the southern Piedmont. It is a land of old and hard rocks. Glaciers scraped away the soil and carried rocks from the elevations and strewed them over the land. Streams have stolen the loose soil as it has been set in motion by wind and rain. Along its deeply indented ocean boundary there is no level coastal plain. The thin and rocky soil of much of its surface makes farming unprofitable. Only a few years ago the landscape was conspicuous for its abandoned farms with weed-infested fields, decaying fences, boarded-up farmhouses, and dilapidated barns. Then came the automobile bringing tourists and vacationists to climb the mountains, fish in the innumerable lakes, visit its historic shrines, revel in the exhilarating climate, and otherwise enjoy its manifold attractions.



Photo by James Sawders

Danish Village tourist camp, near Portland, Maine. The rationing of gasoline with consequent curtailment of tourist travel has hurt greatly the entertainment industry in New England.

Abandoned farms were purchased by city dwellers, and houses and barns were renovated or rebuilt for human habitation. Tourist homes and filling stations soon dotted the highways, and a new prosperity came to the section. Dairy farming, truck gardening, and fruitgrowing succeeded where general agriculture had failed. New England's rapid streams that could be used to develop power, its numerous and excellent harbors, and its unequaled location for the development of industry and commerce have turned the energies of the people into nonagricultural pursuits. Lack of mineral resources caused the development of metal manufacturing in a manner and on a scale entirely different from what might have occurred if this section had produced its own raw materials. No other part of the country of equal area has been awarded so large a sum in contracts by the Federal Government to carry on war industries. The story of manufacturing in New England will be told in later sections.

The Interior Plains. Between the Appalachian Highland on the east and the Rocky Mountains on the west lie the Interior Plains occupying approximately half the area of the whole United States.

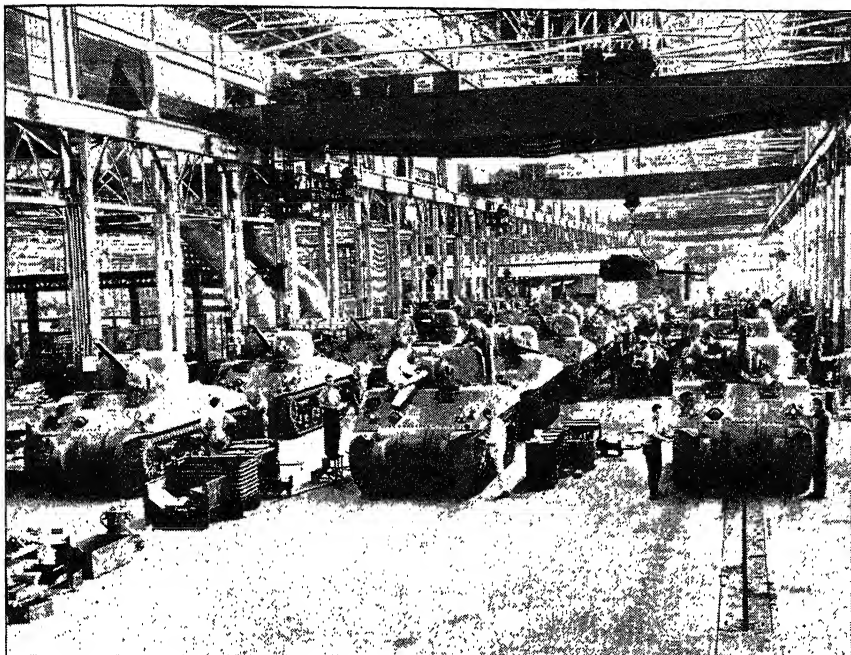


Courtesy Caterpillar Tractor Company

Cultivating corn with a Diesel tractor. Note that the earth is being stirred about three rows of corn at the same time. Very soon the corn will be too tall for the tractor to pass over it.

This large region shows a great diversity of climate, soil, resources, and human activities. For purposes of description we divide it into the Central Plains, or Central Lowlands, and the Great Western Plains.

The Central Plains. The section of the Interior Plains lying east of the 100th meridian is a vast area of nearly level land having an abundance of rich soil and sufficient rainfall to make irrigation unnecessary. It is the region from which comes a large part of the food supply of the nation and the region to which we look for the enormous supply of lend-lease food sent to our allies. The cereals, especially wheat and corn, find here the soil and moisture required to make this the most important food-producing area in the world. The level land makes possible the extensive use of farm machinery so that enormous crops can be produced in proportion to the number of agricultural workers engaged. It is natural too that this great food and feed section should be the place where millions of cattle, hogs, and sheep are raised to supply meat for all the people. Throughout this comparatively level country the construction of highways and railroads has been proportionately cheaper. For this reason this section is abundantly supplied with arteries of transportation by which



Courtesy Chrysler Corporation

An assembly line in a plant where tanks are being constructed. Notice that the tanks are moving toward that part of the room shown in the foreground. The turrets containing the large guns are being added as the tanks move forward.

the products of the farms easily and quickly reach the markets of the near-by cities and towns.

One would hardly expect an area so well suited to agriculture to possess mineral resources; yet many of the states included in this region are underlain by rich deposits of coal and lignite. Petroleum and natural gas are found in many sections. Limestone and valuable clays are also abundant.

Much of the manufacturing of this region has to do with the processing of food products. Hence, packing houses, flour mills, canning factories, and similar industries furnish employment to thousands of workers and because they are classed as essential industries are still allowed to operate. Wherever water power or power derived from coal and good transportation facilities make easy the securing of raw materials and the distribution of finished products, other manufacturing industries have sprung up. Some of these are engaged in the manufacture of leather and articles made of leather, and in peacetime in the building of automobiles with many different plants furnishing parts or accessories, and the construction of farm machinery; still others normally are busied with the manufacture of

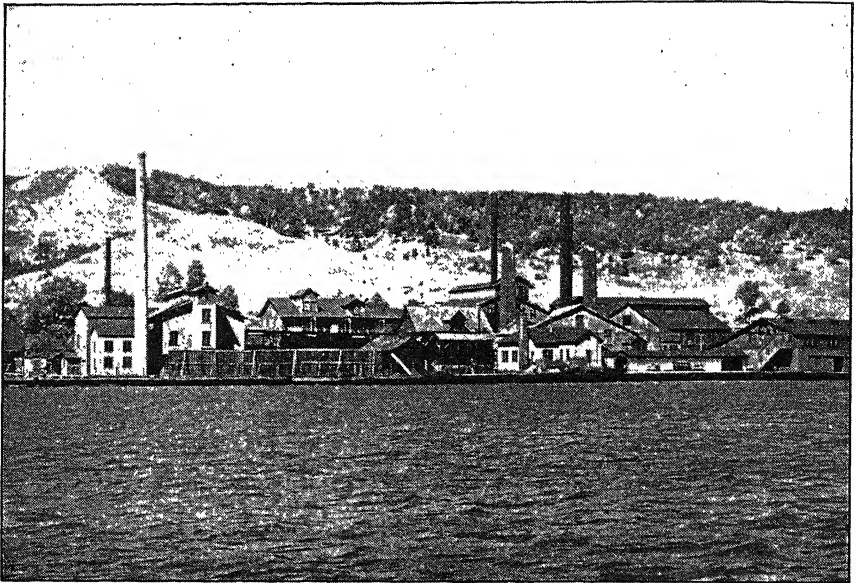


Photo by James Sawyers

Copper smelter near the "Soo" Canals in northern Michigan. Early settlers found the Indians of the region using copper arrow heads. Some of the copper of Michigan occurs as native or pure copper.

home appliances, plumbing supplies, electrical devices, rubber goods, and countless other necessities or luxuries, now classed as nonessentials. Because of the automotive and related industries no other part of the country was so well prepared as this to undertake the manufacture of airplanes, airplane engines, tanks, trucks, and guns.

The Laurentian Highland. Bitten into deeply by the western extension of Lake Superior is an area known as the *Rocky Lake Country*. It includes northeastern Minnesota, northern Wisconsin, and part of the peninsula of northern Michigan. It is a southern extension of an upland, most of which lies in Canada north of the St. Lawrence River and the Great Lakes where it is called *the Canadian Shield*. This region abounds in various mineral ores. Northern Minnesota and the Upper Peninsula of Michigan contain the richest iron-ore deposits in the world. The Keweenaw Peninsula of upper Michigan contains some of the largest-producing copper mines in this country. Formerly this area was heavily forested and its white pine was much sought after, but excessive cutting of both hardwoods and softwoods has made this region much less important as a lumber producer than it was a few years ago. Reforestation and other conservation measures, encouraged by state governments, may again make this section's tree crop important.

The Ozark Plateau. In southern Missouri and northwestern Arkansas is an upland of very old rock in the midst of the Central Plains; it covers an area about equal to that of the state of Georgia. Forests once covered the entire region, and it is still a source of tree products, especially oak railroad ties and mine props. The hillsides once covered by forests now produce luscious apples and other fruits. Parts of the plateau seem especially adapted to the production of strawberries and grapes. This plateau also has underground wealth in the form of lead and zinc ores; it also has great hills of granite and an abundance of building stone.

The Great Plains. From the Central Plains to the foot of the Rocky Mountains and from Canada to Mexico the Great Plains extend. These plains are in reality plateaus very nearly barren of trees. The westerly winds lose most of their moisture in passing over the mountains to the west, and consequently the Great Plains are a land of little rain and most of the farming must be carried on by irrigation or by dry farming. If it were not for the cyclonic storms which bring moisture-laden winds from as far away as the Atlantic Ocean and the Gulf of Mexico, this region would be as dry or drier than the country immediately west of the Rocky Mountains, which is the region of smallest rainfall in the United States. On these plains great herds of buffaloes once roamed because of the native grasses which afforded them food. Later these animals were almost exterminated by the Indians and the Western pioneers, and herds of cattle grazed there in their place. Stories and songs of the cowboys and the round-ups remind us of those days when this great expanse of territory was Government land. It was a sort of public range where hundreds of herds, each with its distinctive brand, were cared for by the herdsmen mounted on their cow ponies. Today fences subdividing this area indicate that private possession has succeeded Government ownership. Alfalfa and other drought-resisting plants and cultivated grasses have been planted to supplement the native grasses that formerly furnished pasture for the cattle. The Great Plains also have considerable mineral wealth that has only been exploited in a small way. In eastern Colorado coal is mined, and North Dakota, Montana, and Wyoming have vast beds of sub-bituminous coal and lignite. Petroleum is being produced in several states of the Great Plains including the Texas Panhandle.

The Rocky Mountains and the Intermontane Plateaus. This area includes the Rocky Mountains and the plateau region between them and the Sierra Nevada and the Cascade Ranges farther west.

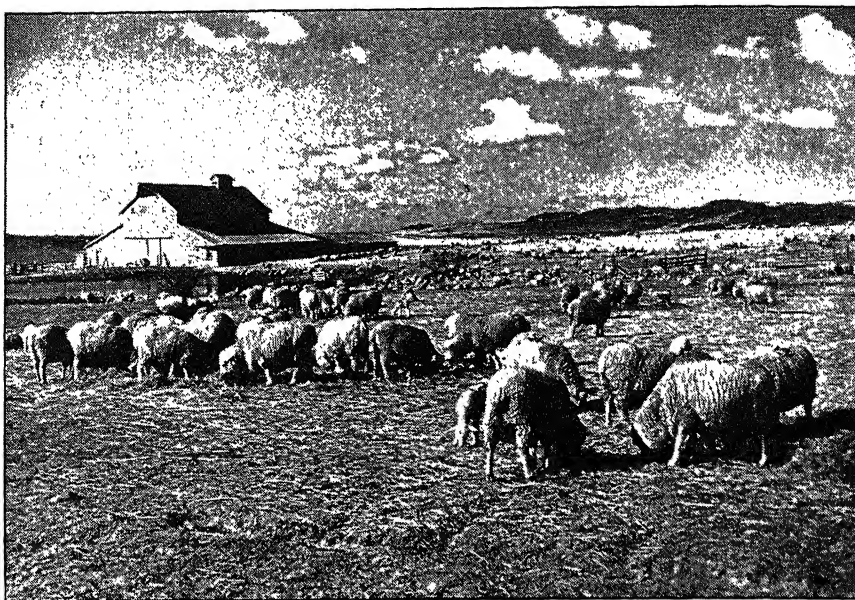


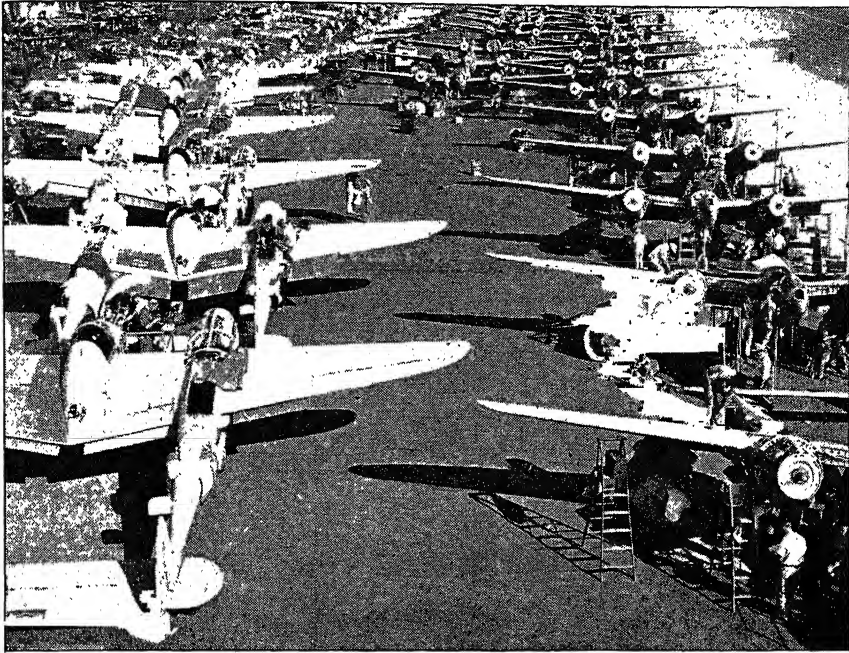
Photo by James Sawders

A large sheep ranch near Twin Falls, Idaho. Large areas in the intermontane region of the Northwest where rainfall is very light are given over to sheep raising.

Because of its light rainfall it is the most extensively irrigated section of the country. The National Government once owned all the land, but now much of it is in the possession of private owners. Because their cost is too great to be undertaken by the farmers themselves, the Government has developed the large irrigation projects in this area. Millions of sheep pasture on the Government-owned lands and the ranches that are privately owned. Herds of cattle feed on the grass in many sections.

This region is rich in many minerals. Gold, silver, copper, and zinc are found here. Coal and iron ore are abundant and petroleum is an important product in several states. There are immense resources of oil-producing shale and phosphate rock that will be utilized at some future time.

The Pacific Highlands and Lowlands. Westward from the Sierra Nevada and the Cascade Ranges and extending to the western ocean is the so-called *Pacific Slope*—an area of highlands and lowlands. This region exhibits great diversity in temperature and rainfall and consequently in agricultural products. In the south are the wonderful fruit and vegetable lands where irrigation must be used because of the lack of sufficient rainfall for growth of plants. In the north are the enormous forests of majestic redwoods, cedars, Douglas



Courtesy Lockheed Aircraft Corporation

"Lightnings" for the United States Army Air Corps. Outdoor assembly lines in Burbank, California. Production outside and inside the plant goes on night and day.

firs, and pines. This area is our greatest present and future source of lumber. In the valleys between the almost parallel ranges are rich agricultural lands and the homes of a large part of the rural population. Coal and iron are scarce in this region. Since 1892, however, when petroleum was discovered in California, this source of power and the harnessing of streams have provided abundant and cheap facilities for the development of manufacturing industries. Even before the outbreak of World War II there had developed important plants for the manufacture of airplanes. These plants have expanded enormously and branches have been established in other parts of the United States and in Canada. Here too are some of the leading shipyards of the country. Water from its mountain sources supplies both irrigation and power for the lowlands unendowed by nature with sufficient rainfall or with coal.

An occupation giving employment to thousands of workers is the fishing industry. The catching and canning of salmon will be described more fully later. Other industries which employ large numbers of people in this region are petroleum refineries, fruit and vegetable canneries, wineries, packing houses, flour mills, lumber mills,

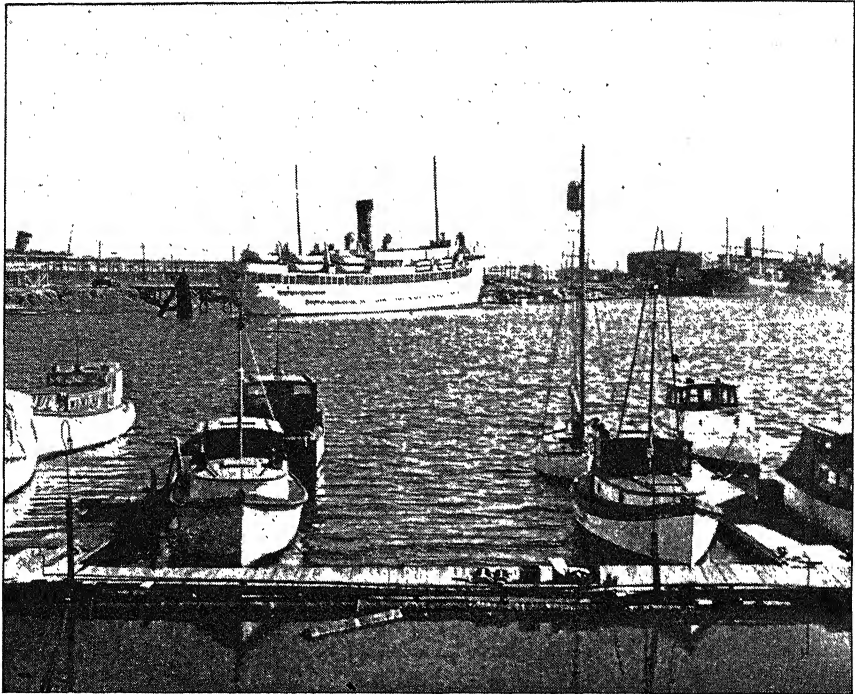


Photo by James Sawders

Wilmington, the harbor of Los Angeles. Although Los Angeles is nearly twenty miles from the Pacific Ocean it is connected with its harbor by a narrow strip of land owned by the city.

and pulp and paper mills. Several transcontinental railroads and air lines furnish comfortable and rapid transportation all the way to the western coast from all sections of the country. Fast freight lines with refrigerator cars transport fruits and vegetables from California's orchards, vineyards, and truck gardens to the cities of the eastern seaboard. The Pacific Coast has not as many natural harbors as the Atlantic Coast has, but San Francisco harbor and Puget Sound offer unexcelled shipping facilities for coastwise shipping and seaborne commerce to and from the Orient. The city of Los Angeles has constructed an excellent artificial harbor.

GUIDES TO STUDY

1. Why has our country progressed rapidly from small beginnings?
2. In what ways is the climate of our country favorable to progress?
3. How do the various features of surface and climate aid in training our service men?
4. What are the advantages of the location of the United States?

5. In what ways does our mineral wealth make for industrial growth and for strength in time of war?
6. What purposes are served by our forests?
7. Show that coal, oil, and water power are the muscles of a nation.
8. Study the map (p. 169) and fix in mind thoroughly the names and location of the natural or physiographic regions of our country.
9. Which of these natural regions supply the country with the most valuable products both in kind and in quantity? Upon which of the regions does the rest of the country most largely depend? Why?
10. Why did the early settlers move westward?
11. Why have highways and railroads followed the routes taken by the early pioneers as they moved westward?
12. Explain each of the following terms: Piedmont, Fall Line, irrigation, conservation, reforestation, Texas Panhandle (what other state has a panhandle?), intermontane plateau.

TOPICS FOR CLASS DISCUSSION

1. The importance of the size of a country.
2. The kinds of plains.
3. The development of the Appalachian Highland.
4. The importance of our coasts.
5. The protection of our country by the oceans.
6. The United States-Canada boundary.

WORK TO BE DONE

1. On an outline map of the United States draw the boundaries separating the natural regions of the country. On the back of the map or in your notebook in three columns write as follows: In the first column the names of the natural regions; in the second column opposite the name of each region the characteristics of that region; in the third column the resources or products of each region.
2. Make a special study of the region in which you live. What resources are responsible for the industries of the region? In what ways is your region related to or dependent upon other regions? What products does your region offer for export?
3. Make a collection of pictures showing the resources of one or more of the natural regions.
4. Bring to class newspaper clippings which have to do with the characteristics, the resources, or the industries of sections of the United States. Relate the articles to the natural regions and locate the places on a map.
5. Assign a natural region to an individual or to a group of students for special study and report to class.
6. Study carefully the pictures in the text illustrating the natural regions. Have students question the class as to what each picture tells.
7. Explain and illustrate in what ways differences in climate account for differences in occupations in various sections of the United States. Was climate the only influence in each case?

UNIT VIII. VICTORY IS OUR NATION'S BUSINESS

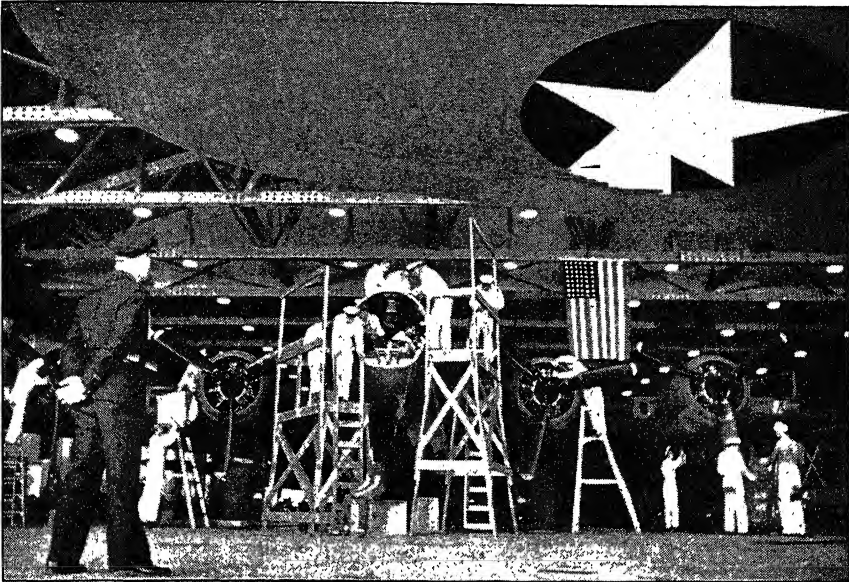


Courtesy United States Coast Guard

The Coast Guard scores a direct hit. Coast Guard planes operating from the shore and aided by carrier-based planes in midocean have nearly overcome the submarine menace.

I. THE AIRCRAFT INDUSTRY—WINGS TO WIN

From peace to war. It hardly seems possible that our country's industries could be so completely changed from the needs of everyday life to the demands of war production. Many of the articles

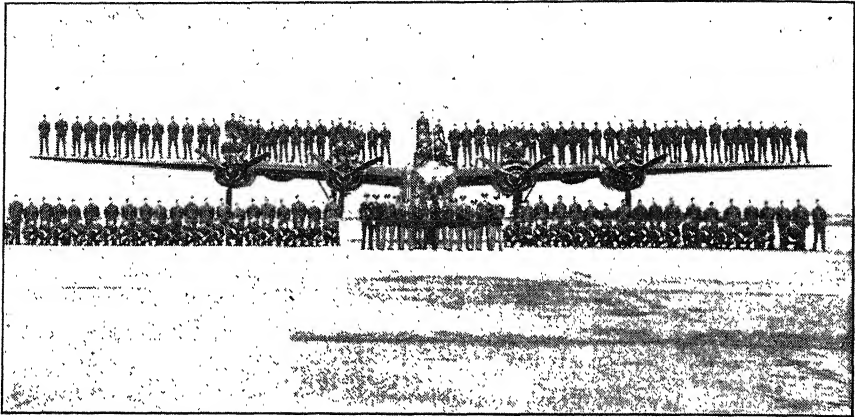


Courtesy United Air Lines

The assembly turns out bombers all alike. At this plant at Cheyenne, Wyoming, each bomber is being given last-minute changes to fit it for the particular work that it has to do in the part of the world to which it will be sent.

needed in the home are no longer manufactured. Among these are refrigerators, radios, oil burners, farm machinery, and many other supplies too numerous to mention. Automobiles and parts for civilian use are no longer made, or, if parts are made, it is for the purpose of keeping on the road the cars now in the hands of owners. Parts are obtained with difficulty and are likely to be of inferior quality. It is clearly up to the civilian to see that all the equipment used in his home and in his business is kept in the best possible condition so that it will last as long as possible. The longer the war lasts, or the longer it is necessary to keep fighting forces in the field—and that is almost sure to be several years—the harder it will be for the average citizen to obtain new equipment or even parts to repair the old.

The reason for this is well known to everyone. The industries of the country are streamlined for war production. Plants making planes, tanks, guns, ships, equipment, and ammunition require all the raw material, all the power, and all the labor it is possible to secure. War is our first business. We must see to it that our armed forces and those of our Allies are supplied with all the equipment needed and that that equipment is made of the very best material obtainable. To make this achievement possible the supplies for everyday living must be sacrificed.



Courtesy Consolidated Vultee

A Liberator four-motored bomber at a Texas training field, where bombing crews are learning to operate it. The number of men give an idea of the strength and the spread of the wings.

Planes and more planes. Whether over the land or over the sea the tide of battle is turned by the airplane oftener than by any other weapon. The most powerful army supported by tanks and artillery alone may be defeated by a strong air force. The most powerful battleships on both sides have been bombed and sunk by planes. The British suffered one of their most humiliating defeats when the *Repulse* and the *Prince of Wales* were sunk off the Malay Peninsula as a result of airplane bombing by the Japanese. The German battleship *Bismarck* was sunk by being bombed in the North Atlantic by airplanes. Nearly all the losses suffered by the Japanese navy in the South Pacific have been due to the superior work of American bombing planes.

Britain can protect its shores mainly by means of airplane offense. By day and night swarms of bombers cross the English Channel to destroy German munition works, munition dumps, power plants, oil tanks, railroad junctions, and locomotives. Flights are made as far east as Berlin and Danzig. The second front and the invasion of the continent depend very largely on the ability of the United Nations to confront the Axis with an air force more powerful than their own.

Bombers of larger and larger size are being constructed every month. Their flying range is ever increasing and their bomb load is constantly becoming greater. Our military leaders say of our largest bombers, the Flying Fortresses and the Liberators, "These are to be the last of our small bombers." Planes carry troops and tanks to

the theatre of action. Paratroops dropped behind the lines of battle render useless strong defense barriers and bring the attack to unexpected areas.

Sky-high in production. With the importance of the airplane clearly demonstrated there was nothing for America to do but to build planes. Today a single plant turns out in one month more planes than were built in the United States previous to the beginning of World War II. Since September 1, 1939, when Germany invaded Poland, the building of aircraft has become the leading industry of the country, the Pacific Coast plants alone employing more than 300,000 people. In the Seattle area the Boeing plant is the home of the great Flying Fortresses which the Army Air Force calls the "backbone of our air offensive." The Army considers the Flying Fortress "the best daylight bomber in the world." "At Midway Fortresses bombed two aircraft carriers from heights of nearly four miles and scored direct hits on both, finished off another carrier found already smoking, and attacked a cruiser which was left in flames." In the same battle the Fortresses shot down eight Japanese planes without loss to themselves. Military strategists are convinced that it was the success of those planes that turned the tide of battle in the Pacific. In many an encounter since that time Fortresses have proved themselves equally effective. The Liberator, another large bomber, is a plane destined for the same type of action as the Flying Fortress.

These great bombers have the flying range and the striking power demanded by a global war. They can operate effectively as no other weapon can over mountains, deserts, land, or sea. They can carry from two and one-half to four tons of bombs over a range of 3000 miles.

In Southern California are eight other plants which are manufacturing many of the planes made in the United States. The airplane industry, together with other growing industries, many of which center around the airplane plants, has brought workers to the Far West from all parts of the country. In the first two months of 1942 more than a million people migrated to the Pacific Coast. Since that time thousands of workers have been added. Someone has said, "Before the war old people went to the Coast to retire—and die; now the young are moving in—to live."

The great need for labor has led to the employment of many women in aircraft plants. It is predicted that nearly all positions in the final assembly line will be held by women, except in places where the parts are too heavy for them to handle. Employment of women

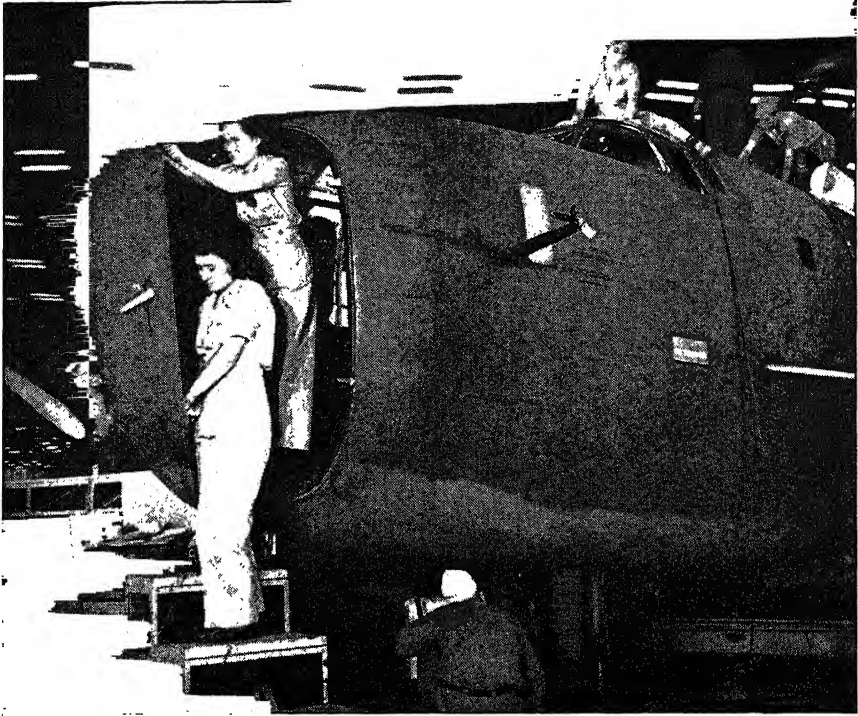


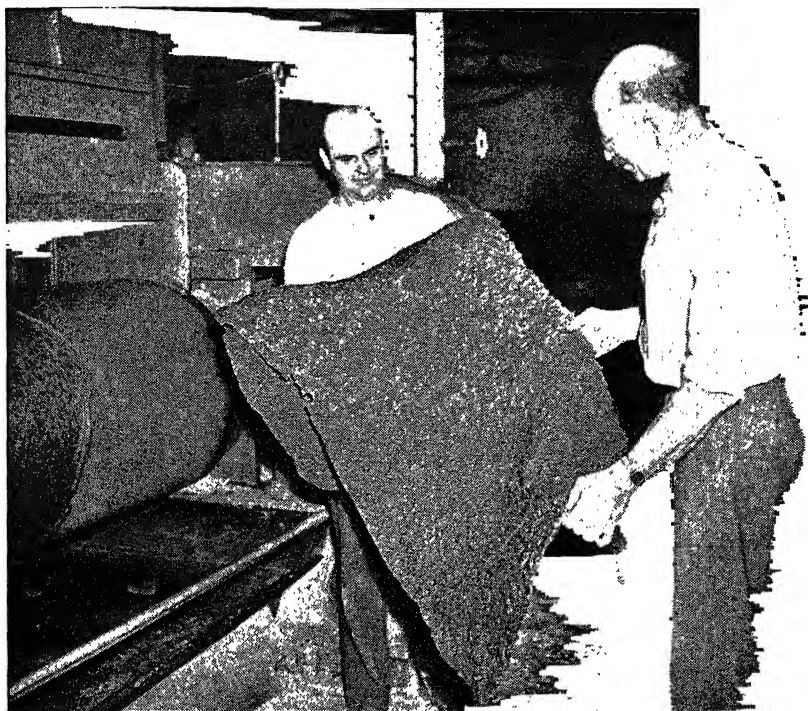
Photo by Office of War Information

Placing the door on a new transport plane. This is one of the last operations on the assembly lines. Notice that both men and women are working on the plane.

releases men for other parts of the plants where men are actually required or it leaves them free to join some branch of the armed forces.

From auto to plane. It would have been impossible to produce the number of planes needed had not the automobile manufacturers turned from the making of automobiles to the making of planes. Executives and engineers from the automobile factories of Detroit visited the bomber plants on the West Coast to learn just how bombers are made. As a result of this visit, the Ford Company erected at Willow Run, Michigan, a building one mile long and one-fourth mile wide. Here assembly lines are used similar to those employed in making automobiles. The plant is now in operation and when working at capacity can turn big bombers off the assembly line at the rate of one per hour.

Engineers and executives from automobile plants in Detroit also visited a factory near Hartford, Connecticut, where airplane engines of superior quality are made. Here they found engine parts made with a precision they had never known before. Parts must be true



Courtesy Goodyear Rubber Company

A slab of synthetic rubber taken from the mill rolls in Akron, Ohio. The plant is owned by the Federal Government but is operated by the Goodyear Rubber Company.

to specifications to two ten-thousandths of an inch. On such accuracy depends the success of a raid on German factories and railways. Upon skilled and careful workmanship depend also the lives of the men manning the planes. Therefore success in the factory is really the foundation of success in the air. On returning to Detroit the executives made plans to produce these engines on a large scale. Before this time complaints had been made that too large a proportion of the engines was being made at one place. Hartford is only a few minutes' flying time from the Atlantic, and a bomb or two might destroy the entire plant. Now there are a half-dozen plants manufacturing such engines scattered throughout the country. Recently a government contract for the making of airplane engines was placed with a company with the understanding that the plant should be located west of the Mississippi River.

A General Motors Division constructed on what was once a prairie farm a new plant for the purpose of making the Pratt and Whitney airplane engine. Within two hundred forty-three days from the time ground was broken for the foundation of the factory



Courtesy Boeing News Bureau

Boeing Flying Fortresses on assembly lines in Seattle. As they move forward, there will be added to them tail sections, wings, engines, and armament. They will then be on their way to win the war.

the first engine went to war. In another case a new defense factory was built in three months. In that time there went into the construction of the plant 10,000 tons of steel, 3,000,000 bricks, 145,000 panes of glass, and 250 miles of electric wires. Soon after the operation of the plant began, the original program was doubled, and in a short time was doubled again.

In some of the converted automobile plants it was found that as much as three fourths of the equipment could be adapted at once to military production. In others only the buildings could be used and new equipment had to be provided. In all cases the change from the making of cars to the making of planes was made with very little loss of employment. Change to military production has not been limited to automobile plants. One the largest rubber plants of the country has adapted a part of its equipment to the manufacture of barrage balloons and inflatable rubber lifeboats, as well as to the making of tires for airplanes, tanks, and other vehicles used by the armed forces. This same company also manufactures antiaircraft guns, machine guns, and cartridge clips. Like all the other rubber com-

panies it is busily at work perfecting and producing synthetic rubber for war use.

The industry widely scattered. Wichita, Kansas, has been building planes for more than thirty years. The first commercial plane to fly from San Francisco to the Hawaiian Islands was built there. At Wichita is located a large branch of the Boeing Aircraft Company of Seattle where parts of the Flying Fortress are made. There also are built many planes used for training pilots both in the United States and Canada.

There are few, if any, states which make no contribution to the airplane industry. The large companies establish branches in various parts of the country. Wherever there are machines and plants already built, and where there is labor to be employed, many new factories have been established even if it was necessary to construct an entirely new plant. Widely scattered plants make for the safety of the industry in case of bombing or sabotage. Nearly two hundred fifty factories are utilized in building Flying Fortresses. These factories are located in more than seventy-five cities in widely separated parts of the United States.

Notwithstanding the great industrial development of the Pacific Coast and the rise of new manufacturing centers throughout the country, the region about the Great Lakes stands first among all parts of the country in the number and size of defense industries. No other part of the country possessed the foundation of peacetime manufacturing capacity upon which defense industries could be built. In 1942 there were 49,000 airplanes manufactured in the United States. The output for 1943 was about 100,000 planes, the exact number being a military secret. The President's goal for 1943 was an airplane every four minutes.

What the American plane stands for. Type for type American planes excel anything which the Axis has as yet put in the air. American aircraft are superior to others in speed, range, load-carrying capacity, and fire power. American planes are said to be inferior to the Japanese only in the matter of weight. Some of our planes are fifty per cent heavier than similar Japanese planes. Weight limits speed, maneuverability, and climbing power. Japanese Zero planes are swift and often can escape combat if need be, but the pilot does not dare stay and fight it out on anything like equal terms.

American aircraft are designed for ruggedness, striking power, and adaptability because of the necessity of combat in various parts of the world. The Vought-Sikorsky Corsair is a fighter plane pow-

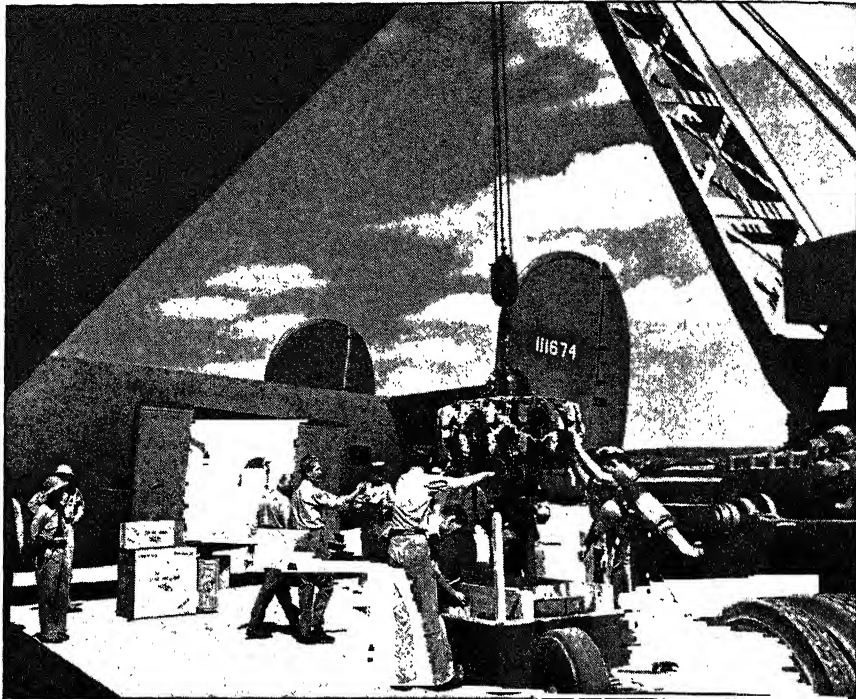


Photo by Office of War Information

A new Consolidated transport plane being loaded with cargo. Not long before Pearl Harbor the site of the plant where this plane was made was a cow pasture. This transport plane is an adaptation of a B-24 bomber.

ered with a single Pratt and Whitney engine and having a speed of 400 miles per hour. It is well armored and carries heavy guns. In contrast, the Boeing Flying Fortress is a four-engine bomber capable of flying at a height of about seven miles. That level is well beyond the range of anti-aircraft fire. The Flying Fortress is a first-class high-altitude daylight bomber. It teams up well with the British low-altitude night raiders, thus making it possible to bomb German factories and transportation lines around the clock.

Reasons for locations of plants. The cost of the manufacture of planes is due more to the cost of skilled labor than to distances from the sources of raw materials. For this reason the location of airplane manufacturing centers is not easily explained on a geographical basis. Before the present war the states leading were California, New York, Maryland, and Ohio. With the advent of World War II and the rapid expansion of the industry, new plants were established in widely separated areas. The purposes of the wide distribution are: first, safety in case of attack or sabotage; and,

second, to make use of machines and labor wherever they are located. The automotive industry has branch airplane plants to the number of nearly a thousand distributed throughout thirty-one of the forty-eight states.

Where our planes go. Of the thousands of planes manufactured in the United States some remain in this country for home defense. Lend-lease planes go to Britain, Russia, and China. Those to be used by our own forces go to Alaska, Australia, the islands of the South Pacific, and to our outposts in the Atlantic and the Pacific. Airliners have been modified for use as cargo planes to carry troops, gasoline, equipment, and supplies all over the world. Some of our lend-lease planes and those used by our air force in the British Isles are delivered to Britain by flying them across the North Atlantic. Many transport and cargo planes fly from Florida to Natal, thence to North Africa, Egypt, and the Middle East.

Manning the planes. We now have 1,900,000 men in the Army Air Force and 200,000 in the Naval Air Arm. The War Department plans an Army Air Force of 2,000,000 men. Before the end of 1942 the army was producing pilots at the rate of 40,000 per year and the navy at the rate of 30,000 per year. At more than a hundred fields Canada is training thousands of pilots and technicians. Canada is the center for such training for the whole British Empire. Many pilots and mechanics have gone from the United States to assist in Canadian fields.

GUIDES TO STUDY

1. Why in time of war is it so difficult to obtain many of the articles needed in everyday life?
2. What part do airplanes play in time of war? What proof can you give of this?
3. What are the names of the different kinds of planes now being made? Planes are named according to their uses in war such as bombers and pursuit planes. What others can you name?
4. What qualities make a plane a deadly weapon?
5. In what parts of our country are planes being made in large numbers? Why? What were the chief changes in industry made necessary by the change from peace to war? Which industries were affected?
6. What effect have defense industries had on the demand for skilled labor? Why is it necessary that workers on planes be highly skilled?
7. Why are the airplane and other defense industries widely scattered over the country? Why was it possible to develop great defense industries so rapidly?
8. What features of the automobile industry were at once adopted by the defense industries?

9. Why should the region around the Great Lakes stand highest in making war supplies?
10. To what parts of the world do our planes go? To what uses are they put?
11. What advantages has the United States over other countries for the production of planes?
12. In what ways is the development of the airplane responsible for the fact that this is a global war?

TOPICS FOR CLASS DISCUSSION

1. Uses of the airplane in wartime.
2. Little factories help big defense industries.
3. Two ten-thousandths of an inch. Why?
4. Training pilots.
5. How planes reach the fighting areas.
6. From peacetime to wartime industry.

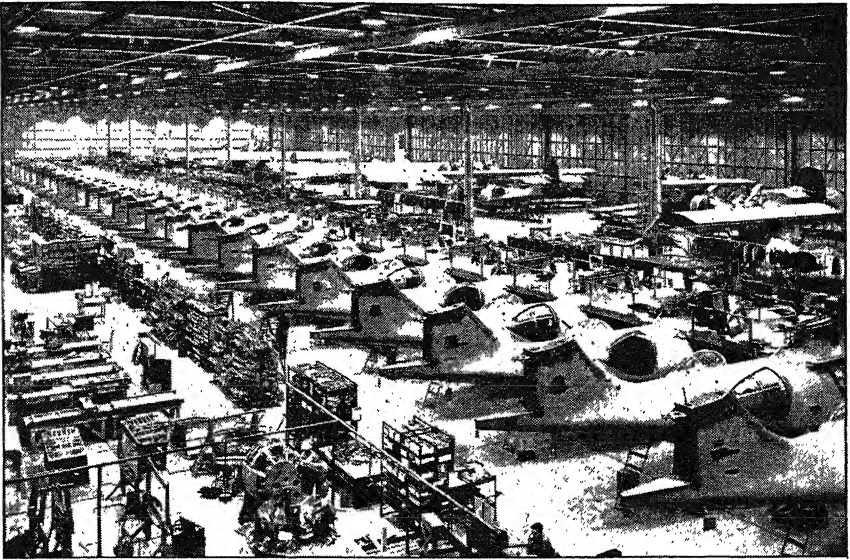
WORK TO BE DONE

1. Make collections of pictures of different kinds of planes. Give the characteristics of each and its uses.
2. Locate on a map of the United States the chief centers for the manufacture of planes. List the advantages of each center.
3. List the names of the planes made in Britain. What planes are made by the Japanese? (See newspapers and magazines.)
4. Bring to class newspaper and magazine clippings and pictures showing our planes in various parts of the world and the work they are doing.
5. Give examples of regional shifts in population caused by wartime changes in industries.

2. THE MANUFACTURE OF TANKS, TRUCKS, GUNS, AND MUNITIONS

From peace to war. Every branch of the service has its air arm, but it is not expected that we shall win the war by aircraft alone. There must also be fighting on land, on the sea, and under the sea, for all of which there must be special kinds of equipment. In 1943 we outstripped the Axis in the manufacture of planes two to one, despite the fact that they had a head start of nine years. We are making trucks, tanks, and guns at the same rate to be sent to the "hot spots" of the earth where they are desperately needed by our own forces and by our allies.

Not all the former automobile plants have been converted to airplane factories. A score or more have turned out more than one half of all the tanks made and more than one third of all the machine guns.



Courtesy Consolidated Vultee

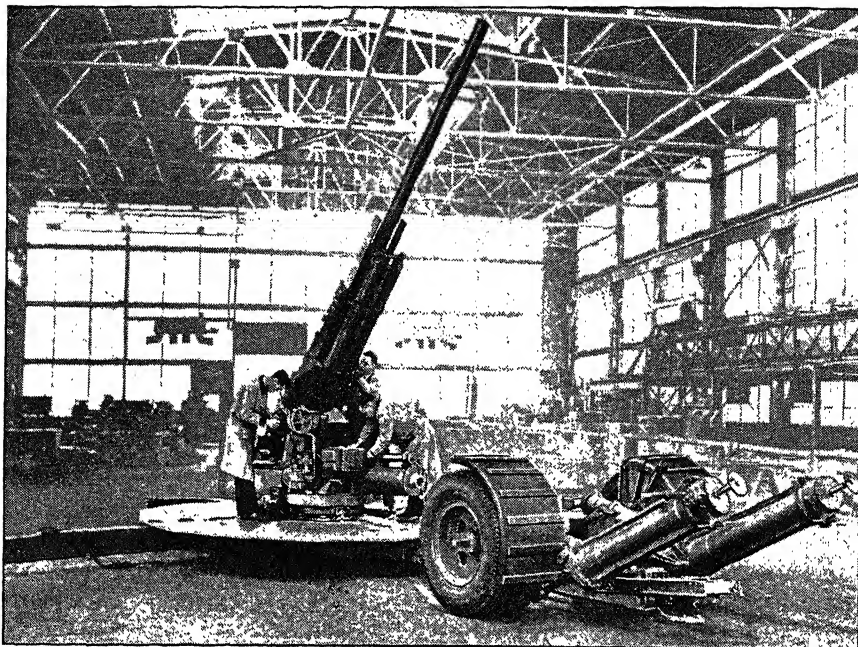
The first assembly line for the manufacture of flying boats. These are the PBV's which the British have named the *Catalinas*. The boats have a flying speed of more than 200 miles per hour and a flying range of 4000 miles. They serve to guard the fleets of the United Nations.

One former motor factory besides constructing bomber planes and gliders has also manufactured jeeps, army trucks, tank engines, truck and jeep engines, gun mounts, and armor plate.

The part which the automobile industry has played in war production is illustrated by a statement of the Chrysler Corporation. Its total war production includes twenty-one military products for use by the armed forces and for the protection of civilians. For the soldier it has made tanks in which he engages the enemy in battle; it has made trucks which carry him and his equipment to the area of combat. It has made stoves which heat his tents and barracks, and field kitchens where his meals are cooked. It has made refrigerators which preserve his food. It has made ammunition for the use of the service men and guns and cannon to fire the ammunition.

The company has an enormous factory for the manufacture of big airplane engines for long-range bombers. For the planes it has made landing gear and bomb racks to carry the load of bombs.

For the Navy this same company has made parts of searchlights which the Navy uses to spot its target. It has made the gyroscopic compasses that guide the ships of the Navy and the Merchant Marine. It has made pontoons for raising ships that have been sunk. Included among its manufactures are tugs, both pusher and puller types,



Courtesy General Motors

Here is being manufactured an anti-aircraft gun. Such guns have played an important part in the defense of English cities.

which are used all over the world from Iceland to Guadalcanal, and on the rivers of South America, India, and Russia.

"In the production of this war equipment the Chrysler Corporation is assisted by 8079 subcontractors in 856 cities in 39 states." This statement gives a bird's-eye view of the defense industries to which the automotive industry has adapted itself.

Tanks are supplied with machine guns and tommy guns and are, of course, equipped with large guns which constitute their principal means of offense and defense. As anti-aircraft guns are used for warding off airplanes, so special equipment is needed for fighting tanks. For the latter purpose antitank guns and antitanks are used. The antitank is a special type of tank equipped with a gun which fires an armor-piercing shell. Many of the larger guns used by the artillery are made in government arsenals in various parts of the country.

In addition to tanks, trucks, jeeps, and peeps are needed in countless numbers. One amphibian jeep called the "swimmin' jeep" is at home in the water as well as on the land. It is especially valuable in regions where there are few bridges or where bridges have been destroyed.

*Signal Corps Photo*

Trucks hauling material and supplies over the Alaska Highway during its construction

Trucks do their part. Before the days of highly mechanized warfare armies depended chiefly on mules for the transportation of supplies. The truck has been called the mule of the modern army. It can carry heavy loads and it can reach places inaccessible by either railroad or airplane. It does its own work and supplements that of every other type of carrier. Although ever since the purchase of Alaska ships and, more recently, cargo planes have been carrying supplies to our outposts there, it was not until the opening of the Alaska Military Highway that we were able to get supplies there in quantities large enough properly to equip our forces to meet the threat of Japanese invasion. Trucks can really claim a share in the victory of Attu. Trucks did not wait for the highway to be finished, for they also played a very important part in its construction. They carried not only men and equipment, but they literally helped move mountains, carting away rock where it was necessary to do blasting and dumping it into swampy stretches where filling was required.

In North Africa many American trucks got through where Axis trucks became bogged down in the deeply rutted sand. American trucks were used by General Montgomery in driving the German General Rommel across North Africa to Tunis. Other thousands of American trucks are on supply lines and at fighting fronts in all

parts of the world. More trucks are always on the way to replace those damaged or destroyed. Trucks and tractors on the farms throughout the country are also doing their share in the war effort.

Bonbons or bullets. All sorts of factories have been called upon to help further war production. One large candy factory is using its candy machines to fill cartridges. Another factory, ordinarily making water meters, is now making parts of shells. Illustrations like these could be duplicated without number. In a little New England village of perhaps a dozen houses there is a small barn containing three or four machines employing five or six men. That insignificant little shop is turning out parts of an essential defense product. Small concerns that formerly made price tags, watch cases, and burned brick have each found some way to adjust themselves to wartime needs. A small company formerly engaged in quarrying stone now makes parts for landing boats. Multiply these little plants by thousands and we have a picture of the whole country tuned to war production.

Skill from the past. In small plants, as in large, the skill of today is a product of the years. Skill has been handed down from generation to generation. An old New England company recently referred to its factory building as a "ghost" building, haunted by the products made there in past decades. It made machine tools when New Englanders persecuted witches. It made old-fashioned sewing machines when hoop skirts were worn. Later it made the old-style high-wheel bicycle. Still later, out through its big doors rolled the horseless carriage. Today parts of a 2000-horsepower engine are made in this haunted old plant. Plants like this producing continuously through the years have helped to maintain a force of skilled workers ready to turn their talents when their country calls for the implements of war.

Time counts. The machines and methods of today are a great improvement over those of yesterday. Today it takes thirty-nine seconds to assemble a certain part of an antiaircraft gun. Three years ago the same work required three and one-half hours. It now takes only one sixth as much time for boring holes in antiaircraft guns as it did three years ago. A huge machine cuts the gears or teeth in a big gear used on a twenty-nine-ton tank. The lines are cut to the thousandth of an inch, and at a rate four times that of World War I. Multiply these short cuts by thousands and we again see what an important part time plays in increasing the production of the equipment needed to win the war.

GUIDES TO STUDY

1. What part do tanks and trucks play in a world war?
2. Why was it possible for our country to turn quickly to the manufacture of tanks and trucks in large numbers? How do subcontractors help?
3. Where are guns of various kinds made? What is an antitank gun?
4. How are the different vehicles adapted to different uses? Give illustrations.
5. Why is the truck of great service to the Army?
6. What kinds of factories have been called into service to speed up war production? Why? How can the little shop help? How has time been saved?
7. In what ways are the implements of modern warfare different from those of previous wars?
8. What advantage other than speed do trucks have over mules in modern warfare?
9. What industries other than the automotive industry have been adapted to wartime production?

TOPICS FOR CLASS DISCUSSION

1. The automobile factory goes to war.
2. The kinds of guns and their uses.
3. Skill from the past.
4. How important is time saved?

WORK TO BE DONE

1. Make a list of the industries you know which have turned from peacetime to wartime manufacture.
2. How many people do you know who have turned from their usual work to defense work? Does this help us to understand why the commodities needed in everyday life are so scarce?

3. THE AUTOMOBILE INDUSTRY—THE BASIS OF OUR WAR INDUSTRIES

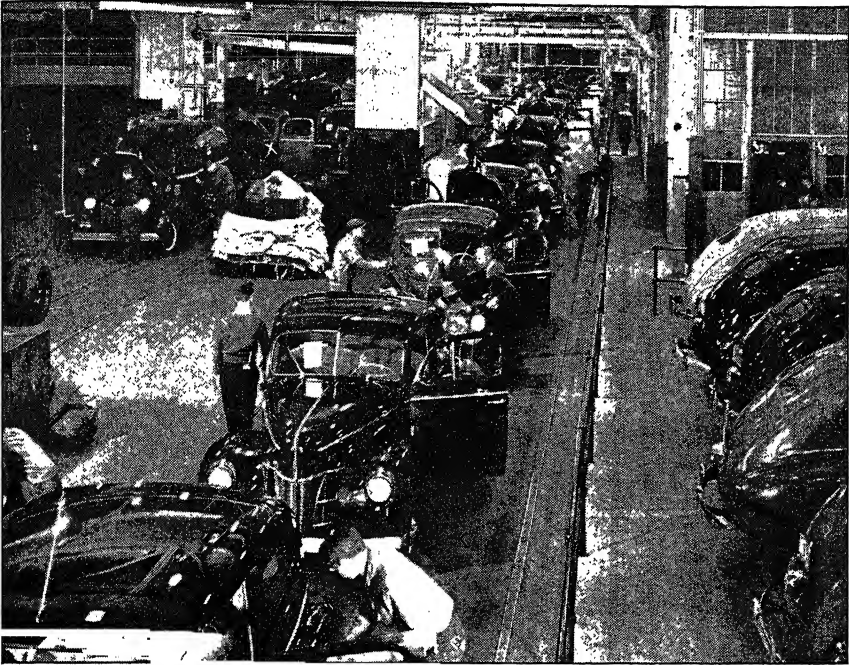
A great war industry. Had it not been for the highly organized automobile industry, it would have been impossible to produce planes, tanks, and trucks for ourselves and the United Nations at the present rate. The industry's plants, machines, highly skilled labor, and research laboratories have all been turned over to war production. The automobile industry was one of the greatest consumers of iron and steel. There were more than 30,000,000 cars and trucks registered in this country or almost three fourths of the world's total. One out of every five Americans owns a car as compared with one out of one hundred fifty-five* persons in the rest of the world. Thirty years ago the automobile was a luxury; today it is a necessity for a large proportion of the people of the country.

An index of prosperity. This industry was closely related to the progress of the country as a whole. When many automobiles were being sold and used, many other industries were spurred to action. Someone has said: "The automobile is another name for iron, steel, and other metals, for rubber, textiles, gasoline, oil, highway materials, vacations, travel, buildings, paint, varnish, the five-day week, employment, traffic policemen, suburban communities, pleasure, and what not."

The automobile industry supplied one of the best markets for the farms and ranches of the country. One manufacturer alone used each year the wool of 800,000 sheep, the hides of 30,000 cattle, the cotton grown on 433,000 acres, corn from 11,200 acres, and the flax-seed produced on 17,500 acres. These were only a few of the many products consumed by the industry. The manufacturers of automobiles made use of eighteen per cent of all the steel the country produced besides seventy-three per cent of the plate glass, six per cent of the hardwood lumber, seventeen per cent of the copper, thirty-six per cent of the lead, twelve per cent of the aluminum, twenty-eight per cent of the nickel, and three fourths of all the rubber imported. Furthermore the industry supplied several million carloads of freight for American railroads.

The growth of the industry. The first steps in automobile manufacture were taken in France, but the rapid development of the industry took place in the United States. The great centers were all in the Middle West, the most important being Detroit. This region offered many advantages. Iron and steel plants were not far away; there were also great forests near at hand to supply the necessary lumber. There were many workmen skilled in the making of bicycles and carriages. Indeed many carriage makers turned to the manufacture of automobiles. There too were the men who became leaders in the development of the American automobile. Among these were Duryea, Olds, Buick, and Ford. To Henry Ford, probably more than to any other man, belongs the credit for the development of the low-priced car.

The assembly line. In a little shed back of his house Henry Ford built his first automobile in 1893. It was an experiment as were all the cars of those days. In 1903 he organized the Ford Motor Company. It was his aim to produce a car at a price so low that it would be within the reach of many people. He did this by making a small car and by organizing his factory so that the cost of manufacture was reduced as much as possible. He decided to make only



Courtesy Ford Motor Co.

The assembly line at a Ford automobile plant. This method of production introduced by Henry Ford made it possible for him to sell millions of cars at reasonable prices.

one type of motor and said jokingly that a customer could have any color of car he chose so long as it was all black.

Mr. Ford was the first to make use of the assembly line along which a part being constructed moves from workman to workman. The engine is kept moving from the time of casting. As it moves, part after part is added until the completed car moves off under its own power. As a rule a workman uses only one tool. The part which he adds is placed beside him so that he is not obliged to leave the space assigned to him. This procedure is possible only when each part is made so accurately that it will fit any car. When Mr. Ford first attempted this, it was believed that parts could not be made with such precision.

The assembly line as introduced by Mr. Ford can of course be used only when articles are made in very large numbers. Experience has shown that by this method the time and cost required for making any part of a car and finally the whole car is greatly reduced. This method by reducing prices has brought the automobile and many other products so made within the reach of a vast number of people.

American cars and trucks in prewar trade. Automobiles, trucks, and parts stood high among our exports. Assembly plants were established in a number of foreign countries. Parts were sent to those countries and there brought together to form the completed car or truck. Our own great demand for cars called for mass production. This in turn made possible manufacture at low cost. Then, if foreign tariffs were not too high, our manufacturers could compete successfully with cars of foreign make. The countries to which we sent cars and trucks in largest numbers were the Union of South Africa, Australia, Mexico, Belgium, Argentina, Canada, and Japan.

GUIDES TO STUDY

1. What were the factors that made the rapid development of automobile manufacture take place in the United States?
2. Why was the automobile a measure of the country's prosperity?
3. What raw materials were used by the automobile industry?
4. Why did Detroit become a great center for the industry?
5. How did the automobile industry stimulate other industries?
6. What are the uses made of motor vehicles?
7. Explain the rapid growth of the automobile industry.
8. What efforts is the Government making to keep all cars running?
9. What were the reasons for the assembly-line method of production? In what ways is this method particularly adapted to wartime demand on industries?
10. Why were assembly plants established in various countries by American manufacturers instead of exporting only finished products?

TOPICS FOR CLASS DISCUSSION

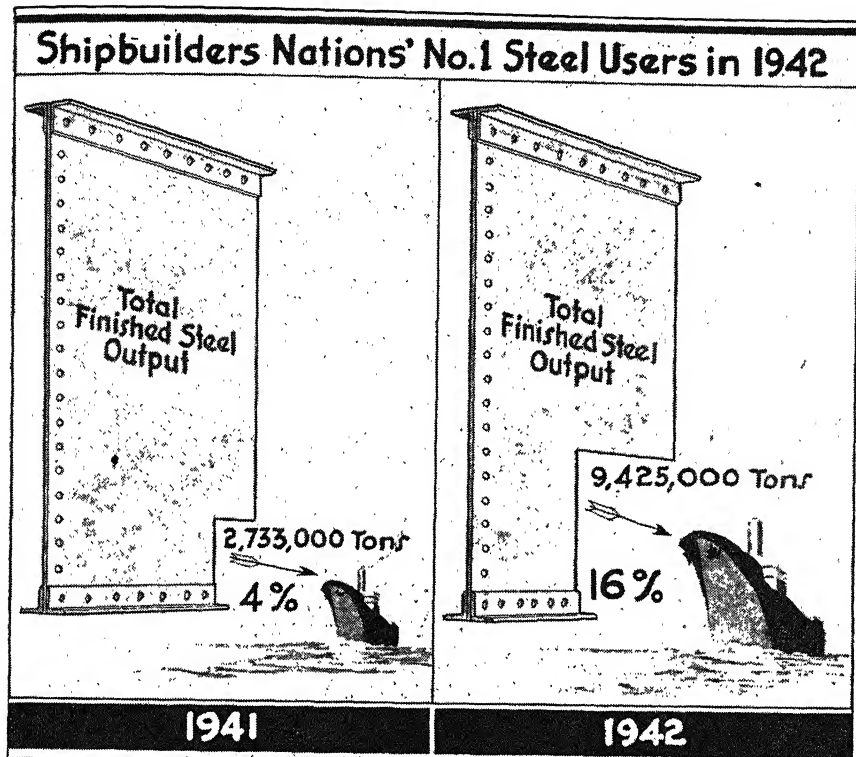
1. Automobiles—old models and new.
2. The assembly line.
3. The American car in foreign lands.

WORK TO BE DONE

1. Make a study of the early leaders in the automobile industry and learn the importance of their work.
2. Describe the workings of the assembly line. Learn how it is used in making airplanes, tanks, and trucks. Study the pictures in the text which illustrate such use.

4. BUILDING SHIPS—MODERN MAGIC

Freedom of the seas. "Freedom of speech, freedom of worship, freedom from want, freedom from fear": the "four freedoms" for which the allied nations are contending are in a large measure de-



Courtesy American Iron and Steel Institute

Note that between three and four times as much steel was used for shipbuilding in 1942 as in 1941. Try to find out what per cent and the number of tons used in 1943.

pendent on the freedom of the seas. Unless all nations, both large and small, can have the freedom to sail the high seas the inhabitants of such nations become virtually prisoners. And when a person or a nation becomes a prisoner freedom is lost. So precious is this freedom of the seas that nations vie with each other in building and maintaining powerful navies to gain it or to defend it.

Up to the years of World War I Germany had a large merchant marine and a powerful navy. With other nations that country enjoyed the ocean privileges common to all. At the close of that war rather than let its navy fall into the hands of the victors German officers scuttled their ships. Germany never regained its former naval strength. Knowing itself to be at a disadvantage, when it laid plans for World War II Germany built hundreds of submarines, shipping's most insidious foe. While surface vessels seldom challenge anything more powerful than themselves, submarines attack anything from a landing barge to a battleship. In the wreckage at Pearl Har-

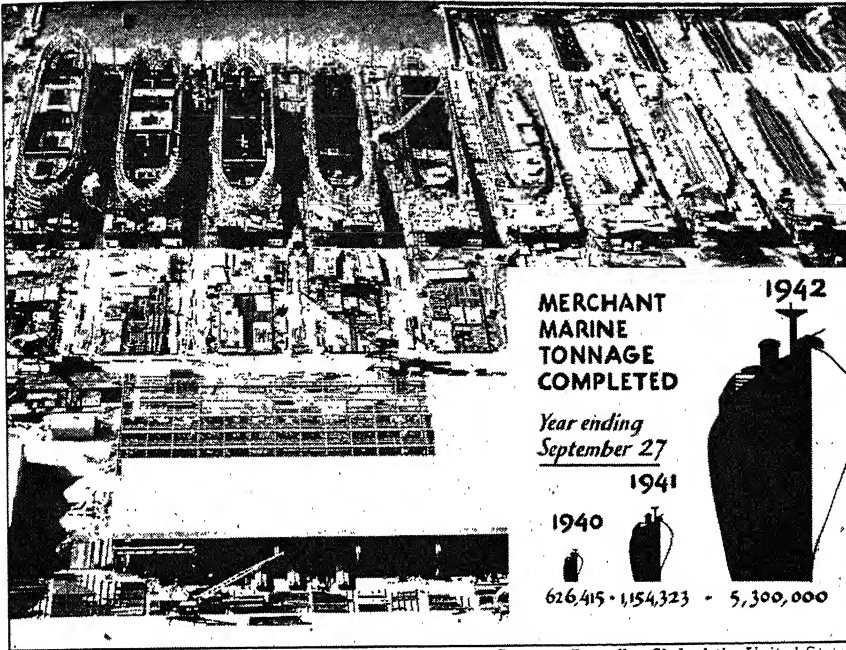
bor we learned that even a two-man Japanese submarine could inflict damage out of all proportion to its size and man power. Just now the submarine is the greatest menace to freedom of the seas.

A backward look. At the outbreak of World War I our merchant marine was at its lowest ebb in history. It had been gradually declining since the days of the clipper ship when the United States led the world in shipping. After the War between the States we turned our attention to the development of the West and Middle West. We lost our interest in shipping. To use an old seafaring expression, "We went ashore and swallowed the anchor." So indifferent did we become that many of our vessels were sold abroad or sailed under foreign registry. We were quite willing to leave to Great Britain and other nations the carrying trade of the world even to the inclusion of our own foreign trade, 80 per cent of which is water-borne.

Letting the other fellow do it may be an easy way out, but it has its penalties, as we discovered to our sorrow when we were caught unprepared in 1917. At that time we not only had to depend upon our allies to arm our soldiers, but we had to borrow 1,200,000 tons of cargo vessels from Great Britain and more than half of our soldiers sent to France went in borrowed vessels. Although, after we got our production into full swing, we sent vessels down the ways at the rate of one every three and one-half days, at the end of the war we had completed only one sixth of our shipbuilding program. Many of those vessels had been constructed so hastily by unskilled labor that they were of little use after the war was over.

We disarm. Soon after the war which was to end all wars was ended, we decided to make assurance doubly sure by holding a "Disarmament Conference." It met in Washington in 1921 for the purpose of putting a limitation on naval armaments. The United States, Great Britain, and Japan agreed to a fifteen-year holiday in the building of battleships. Our merchant marine we ignored completely, leaving it like a derelict to sink or drift as the case might be. From 1922 to 1937 only two ocean-going freighters were built in United States yards.

The Maritime Commission. Fortunately for us in 1936 the Congress became convinced that "It is necessary for national defense and development of its foreign and domestic commerce that the United States shall have a merchant marine sufficient to carry its domestic water-borne commerce and a substantial portion of the water-borne export and import foreign commerce of the United

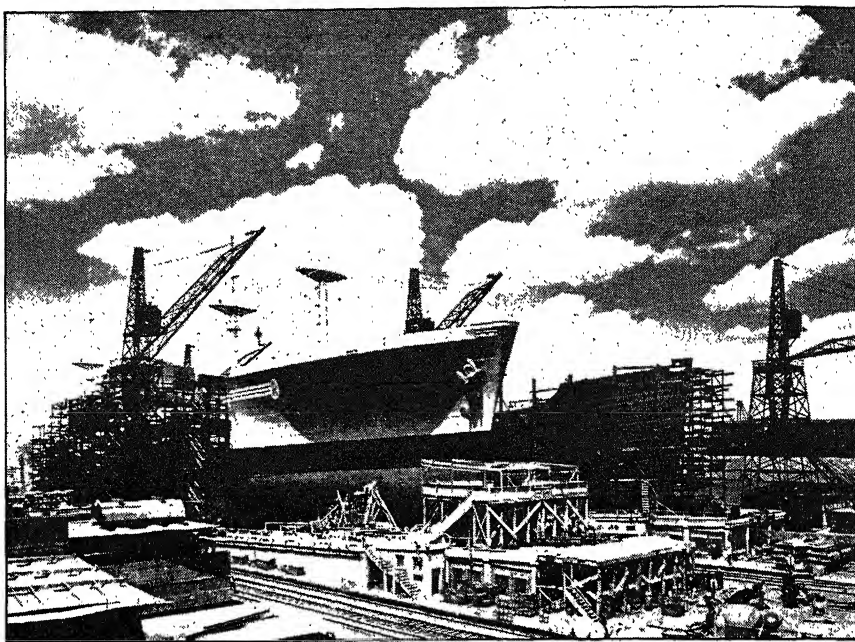


Courtesy Propeller Club of the United States

During the whole of 1942, 746 ships of 8,090,800 deadweight tons were put into service, not including a number of vessels built for the armed forces nor 800 small craft. The goal for 1943 set at 16,000,000 tons will certainly be passed if shipbuilders are given the needed materials and equipment.

States and to provide shipping service on all routes . . . at all times, capable of serving as a naval and military auxiliary in time of war or national emergency . . . It is hereby declared to be the policy of the United States to foster the development and encourage the maintenance of such a merchant marine." To accomplish that end the Maritime Commission was created. In 1938 the Commission started what was called "a long range replacement program" whereby old and outmoded vessels would be replaced by faster and more up-to-date craft with built-in defense features. Many types were to be built, including cargo vessels, tankers, and tugs. So, when in 1939 war broke out once more in Europe, we had our sleeves rolled up.

Lend-lease. As the war progressed, the plight of England became more and more serious. Realizing that that country was really fighting our battle and that, if it went down, we might go too, in March, 1941, Congress passed a Lend-Lease Act. By the provisions of that act we agreed to provide weapons, munitions, aircraft, vessels, machinery, tools, food "for the government of any country whose defense the President deems vital to the defense of the United



Courtesy Bethlehem Steel Co.

The construction of merchant ships. This kind of work is going on at many ports along the Atlantic, Pacific, and Gulf coasts. In some cases as many as a dozen merchant ships are under construction in a single yard at one time.

States." If the foregoing articles to be leased or lent were not already in existence, authority was given for their immediate manufacture in arsenals, factories, and shipyards. Seven billion dollars was appropriated to put the bill into effect. Out of that sum \$629,000,000 was allotted for ships and other watercraft. We went so far, but we would go no farther. Both United States naval vessels and vessels carrying cargoes were forbidden to sail into a combat area or to enter any port of a belligerent nation. Lend-lease was to be on a strictly cash and carry basis.

The passage of that act was like a breath of life to our Maritime Commission. It made possible the much desired expansion of its shipbuilding program. Neither vessels nor anything else, however, can be produced simply by appropriating money for them. The building of ships calls for shipyards, shipways, and shipbuilders. At that time only a few shipyards were in operation and there were only about 20,000 skilled workers available. Down the Atlantic Coast from Maine to Florida, down the Pacific Coast from Puget Sound to the Mexican line, along the Gulf Coast, and on the Great Lakes old yards were reopened and new yards set in operation. Everyone who

thought he could work in a shipyard was welcomed. In the words of one shipbuilder, "We have built shipyards, operating forces, and ships at the same time. Beginning with weed-strewn mud flats for sites; with cowboys, salesmen, and students for workers, with machinery brought from the ends of the country or constructed on the spot, we now produce ships in quantities that amaze the world." Not until we were drawn into the conflict ourselves did we realize the providential nature of lend-lease.

Ships go to war. When the war raced round the world in December, 1941, the President called for a bridge of ships, a "victory fleet." All privately owned ships not voluntarily released to the Government were requisitioned. They were either reconditioned or converted as the case required. One large liner needed for a transport was cut in two, and a middle section was built to scale and welded in place, by which her carrying capacity was almost doubled. In all 84 passenger or combination passenger and freight vessels, 355 tankers, and 667 cargo vessels were turned over to the Government. Another 84 vessels found their way into military service as naval auxiliaries.

Remembering what happened in the last war, we did not fumble this time. Our "victory fleet" program was immediately set in high gear. There were to be fewer shipyards, with more shipways, and construction was to be standardized. A goal of 8,000,000 tons of cargo ships was set for the year 1942; 16,000,000 tons for the year 1943. The challenge was met so "gloriously and efficiently" that by June, 1943, we were promised a production of 19,000,000 tons before the close of the year.

What we are building. We are building vessels of wood, of steel, and, as in World War I, some barges of concrete. Many mine-sweepers are needed. Wood is the only material that can be used in their construction. No iron, not even nails, can be used. Other types of wooden vessels, too numerous to mention here, are also being built for service in all theaters of the global war.

The greater part of the construction is steel. As one can readily understand, the greater portion of the steel used goes into the construction of heavily armed naval vessels. Combat vessels of all types from the battleship down are under construction in the various navy yards of the country and in yards taken over by the Government. One of the most important items in the naval program is the aircraft carrier. You will remember that an aircraft carrier was the "Shangri-La" from which our planes took off for the bombing of Tokyo.



Courtesy Bethlehem Steel Co.

Constructing an oil tanker. The crane at the left is lifting a huge bulkhead into position. Bulkheads divide the hull of the ship into compartments. Our tankers are carrying gasoline and oil to our planes, tanks, and ships all over the world.

The number of classes and the number of vessels in the various classes constructed are, of course, a military secret, but we are told that the time required for construction has been materially shortened. Admiral Leahy has announced that aircraft carriers are being constructed in seventeen months and submarines in a little more than a year, half the time formerly required for those two types of craft; battleships which once required five years for construction are now built in

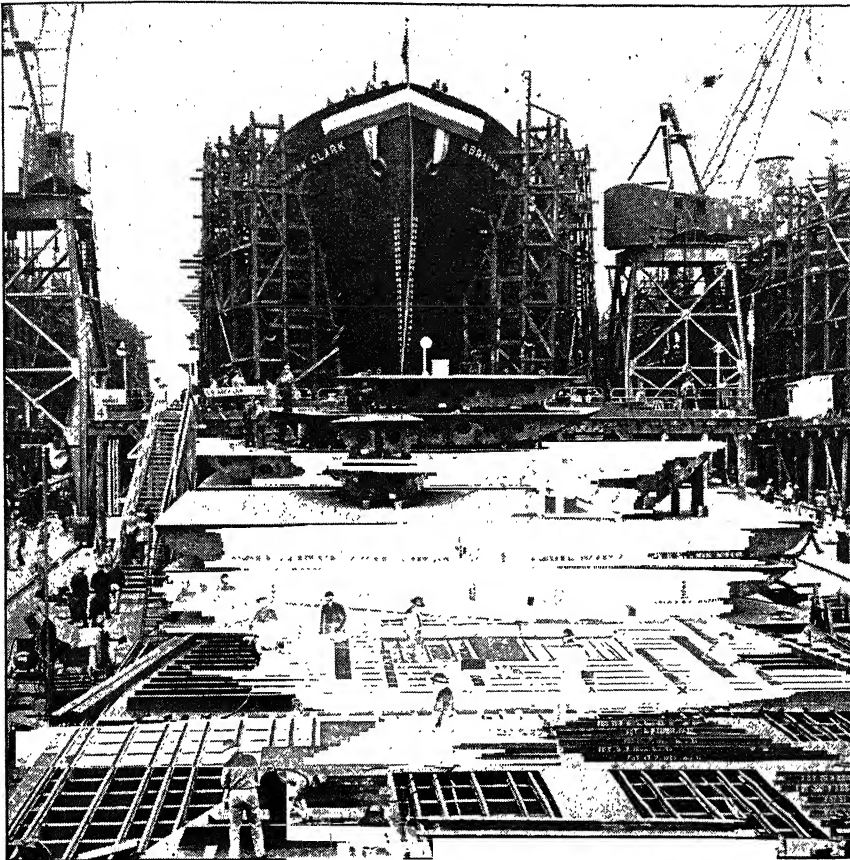


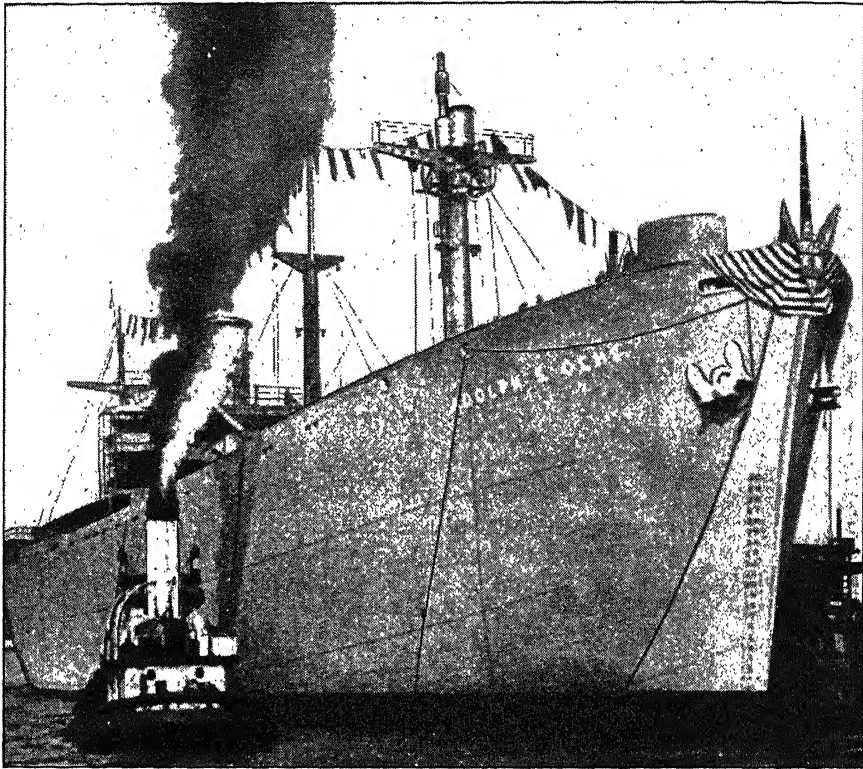
Photo from Keystone View Co.

A Liberty ship just before being launched. In the foreground parts of other ships are being constructed. As soon as the ship on the ways is launched the parts in the foreground will be put to use in building the next ship. In this way a ship can be launched in a week or two after the keel is laid.

three years; and destroyers that were a year and a half in building are now completed in six months.

On the Great Lakes small submarines, landing barges, and other types of small craft are being built. They reach the coast by the way of the Illinois and Mississippi Rivers. Huge ore-carrying vessels of steel that rival battleships in size are also being constructed on the Lakes to move iron ore from the mines to the steel mills.

Liberty ships. The first type of vessel built by the Maritime Commission for the "victory fleet" was the "victory ship." It was a fast cargo vessel, built with an eye to service after the war is over. The necessity for uniform speed while in convoy and the great need of cargo space soon taught us that a slower but larger vessel of

*Associated Press Photo*

The Liberty ship *Adolph S. Ochs*, named for the late publisher of *The New York Times*, just after its launching at the Bethlehem-Fairfield shipyard in Baltimore

simpler design would meet the present needs better—that speed in construction is more important than sailing speed. Consequently, the “liberty ship,” a 10,500-ton cargo vessel, came into being. The first one was launched in September, 1941. The vessels are standardized and the parts prefabricated in factories or shops all over the country. It is claimed that 500 factories and 1,000,000 workers are employed full time round the clock to produce the parts used in the construction of one of those ships. The prefabricated parts are then shipped to the yards where they are welded into a perfect whole.

Welding is the miracle worker of this war. Down welding, a technique recently developed, is a great factor in today’s speedy ship construction. Down welding is just what the word implies. It is done on the ground and does away with overhead welding. A whole section, such as the bow of a vessel, is welded into a unit, then hoisted by a large crane to its proper place and welded to the rest of the hull. Battle injuries to welded craft show that seldom, if ever, does

the welded seam give way. The building of a number of ships on parallel ways close together makes for assembly-line efficiency.

At first it was reckoned that a "liberty ship" would require 105 construction days. That was quickly reduced to 83, to 70, to 60 days. Then, the Kaiser yard in Oregon delivered eleven vessels from eleven ways in an average of 42 days. When shortly after that performance one slid down the ways in ten days, Mussolini said it could not be done and, over the Rome radio, advised Mr. Kaiser "not to launch ships before beginning their construction." It is not recorded what he said when in Kaiser's California yard one slid down the ways 4 days and 15½ hours after the keel was laid. Before the end of the following week the vessel was ready to sail with her convoy. The following day, a smaller vessel, a freighter of 5,000 tons, was launched in another West Coast yard, 3 days and 8 hours after the keel was laid. It must be understood, of course, that in each instance the time from laying the keel to the launching was for assembling the parts only. By June, 1943, more than five ships a day were being delivered to the War Shipping Administration for service wherever needed.

Repair yards. Our repair yards are doing a magnificent piece of work in their special field. The work began on a large scale in 1939 and by 1943 over 12,000 craft of one kind or another had been reconditioned. In addition to the mounting of arms and conversion for special purposes many war casualties have been restored to service as good or better than when new. When a big tanker was torpedoed and blown apart amidships, the two halves were towed into dry dock and welded together. In a very short time she was back on her job again as good an oil carrier as when new. All but two of the vessels sunk at Pearl Harbor have already been salvaged and put back into service.

"Ships and more ships" is our answer to the submarine menace. The freedom of the seas shall be ours.

GUIDES TO STUDY

1. How valuable is freedom to mankind?
2. What is meant by "freedom of the seas"?
3. What effect has a global war on the freedom of the seas?
4. What was the condition of our merchant fleet following World War I?
Why?
5. Why was the Maritime Commission established?
6. What are the provisions of the Lend-Lease Act? What was its purpose?
7. How did the Lend-Lease Act affect the building of merchant ships?

8. How did Pearl Harbor stimulate shipbuilding? Why?
9. What are the different kinds of ships now being built? For what uses?
10. How does the "liberty ship" differ from the "victory ship"? Why was the liberty ship found to be necessary?
11. How rapidly are ships being built? How can this be done?
12. Explain how welding made assembly line production applicable to shipbuilding.
13. Why are repair yards necessary?
14. How does the use of the merchant marine differ in peace and in war?
15. In what ways is the merchant marine necessary for national defense?
16. In what ways do merchant ships and the navy help each other?

TOPICS FOR CLASS DISCUSSION

1. Freedom of the seas.
2. The Disarmament Conference.
3. The Maritime Commission.
4. Competition of water routes with transarctic air routes.
5. Lend-Lease and its work.
6. Our shipyards and their work.
7. What our merchant ships carry and where they go.
8. Convoys.
9. What difference it makes to the citizen of a country whether or not its ships enjoy freedom of the seas.

WORK TO BE DONE

1. Study the pictures in this section and tell what they show of shipbuilding.
2. Bring to class newspaper clippings relating to ships, their cargoes and their destinations.
3. Appoint a committee to study and report to class the history of our merchant marine.

5. STRATEGIC RAW MATERIALS—FROM LAND, SEA, AND AIR

Metals, an absolute necessity. The ancient Israelites in Egypt succeeded fairly well in making bricks without straw. But airplanes, tanks, guns, ships, and other products for offense and defense must have great quantities of the best structural material obtainable and nothing must be lacking. It has been said that, when the old Model T Fords were no longer made and spare parts no longer available, their owners managed to hold the cars together and get a few more turns out of their engines by a liberal use of "spit and chewing gum." Likewise, one of the air heroes of the Bataan Peninsula says that, after the destruction of the air field there, the few remaining airplane

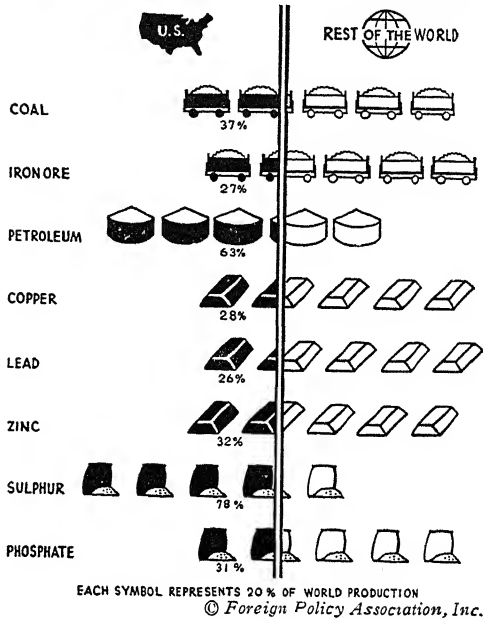
parts were salvaged and by the use of "spit and string" were reassembled into a fairly passable "crate" which made possible the evacuation of a few survivors to Australia. In sober truth a chain is no stronger than its weakest link; neither is any vehicle or instrument of war stronger than its weakest part. For that reason materials for even the tiniest screw or smallest rivet must be the very best and the workmanship above suspicion. Our airplane industry is today the largest single industry in the country. It requires enormous quantities of the finest grades of alloy steel for engines, aluminum for wings, propellers, and other parts where lightness must combine with strength. Magnesium, which is lighter than aluminum, is taking the place of aluminum to a limited degree. Copper, chromium, nickel, tin, tungsten, rubber, wood, and many other materials are among the *musts* needed for our all-out effort.

Fortunately we possess resources greater than those of most other countries. No other country approaches ours in reserves of iron, copper, coal, and petroleum. There are other resources for which we have looked to foreign countries for a part or all of our supply. But even for many of these we are finding substitutes or devising means of carrying on with much smaller quantities. Of the metals iron is by far the most essential and the United States has reserves sufficient for many years to come.

IRON AND STEEL

Iron in history. Iron is mentioned in our earliest historical records. The Old Testament describes Tubal-cain as an ironworker. Ancient races like the Egyptians, Assyrians, and Romans made con-

WE ARE RICH IN MANY RAW MATERIALS



OUR SUPPLY OF VITAL WAR MATERIALS

COMMODITY	USES IN WAR PROGRAM	PRESENT SOURCES	ABUNDANT SUPPLY	FOR ESSENTIAL USE ONLY	CRITICAL SHORTAGE
ALUMINUM (bauxite)	Engines, incendiary bombs, armor plate	British Guiana, Australia, U.S.A.	✓	✓	✓
ANTIMONY	Bullets, shotgun, steel alloys, shell	Mexico, Bolivia, China, U.S.A.	✓	✓	✓
ASBESTOS	Brakeboards, clutch linings, insulation, fireproofing, machine gunners' gloves	Canada, U.S.A.	✓	✓	✓
CHROMIUM	Steel alloyed armor plate, stainless steel, chemicals	Rhodesia, New Caledonia, Cuba, U.S.A.	✓	✓	✓
COAL	Power, heat, coke, chemicals	U.S.A.	✓	✓	✓
COPPER	Ammunition, dynamite, motors, power lines	U.S.A., Chile, Peru, Canada, Mexico, Africa	✓	✓	✓
COTTON	Clothing, tents, smokeless powder, explosives	U.S.A.	✓	✓	✓
FATS	Explosives, medicines, plastics, paper, printing inks	U.S.A.	✓	✓	✓
IRON	Cast iron and steel	U.S.A.	✓	✓	✓
LEAD	Bullets, shot, gas, storage batteries, bearing metals, paints, cable sheathings	U.S.A., Mexico, Canada	✓	✓	✓
MAGNESIUM	Alloys for aircraft parts & engines, bomb casings, incendiaries, tracer	U.S.A.	✓	✓	✓
MANGANESE	Steel alloy	Cuba, Brazil, Africa, Soviet Union, U.S.A.	✓	✓	✓
MERCURY	Detonators, paint, mercury turbines, longitudes, scientific work, medicines	Alaska, Mexico	✓	✓	✓

COMMODITY	USES IN WAR PROGRAM	PRESENT SOURCES	ABUNDANT SUPPLY	FOR ESSENTIAL USE ONLY	CRITICAL SHORTAGE
MOLYBDENUM	Alloy steel for armor plate, tanks, aircraft and locomotive parts, car wheels, oil bulbs	U.S.A.	✓	✓	✓
NICKEL	Alloy steel for armor plate, metal plating	Canada, Cuba, U.S.A.	✓	✓	✓
PETROLEUM	Gasoline, lubricants, fuel oil, diesel oil, chemicals	U.S.A., Mexico, Venezuela	✓	✓	✓
PHOSPHATES	Fertilizers	U.S.A.	✓	✓	✓
POTASH	Fertilizers	U.S.A.	✓	✓	✓
RUBBER	Tires, gas masks, boots, hose, clothing, hospital equipment	U.S.A. (Stockpile and Synthetic), Mexico, Brazil	✓	✓	✓
SALT	Chemicals, tanning, preserving, food preparation	U.S.A.	✓	✓	✓
SULPHUR	Chemicals, explosives, mustard gas, bleaching, rubber	U.S.A.	✓	✓	✓
TIN	Tin cans, metal bearings, bronze, solder	Bolivia, Belgium, Congo, Mexico, French Cameroons	✓	✓	✓
TUNGSTEN	Alloy in high-speed cutting tools, armor plate, gas turbines, armor plating bullets	U.S.A., Bolivia, Argentina, Peru	✓	✓	✓
VANADIUM	Alloy for special steels for heavy guns, railway, bus, truck operation	U.S.A., Peru	✓	✓	✓
WOOD	Construction, fuel, camp, paper, plastics, rayon	U.S.A., Canada	✓	✓	✓
WOOL	Clothing	U.S.A., Australia, Argentina, Uruguay, Brit. So. Africa	✓	✓	✓
ZINC	Coatings, die casting, galvanizing, steel	U.S.A., Canada, Mexico	✓	✓	✓

Pictograph Corporation for "The New York Times"

This diagram shows the regions from which we receive our much-needed war supplies. The black columns show the products of which we have an abundance, those which we must use very sparingly, and those of which there is a distinct shortage.

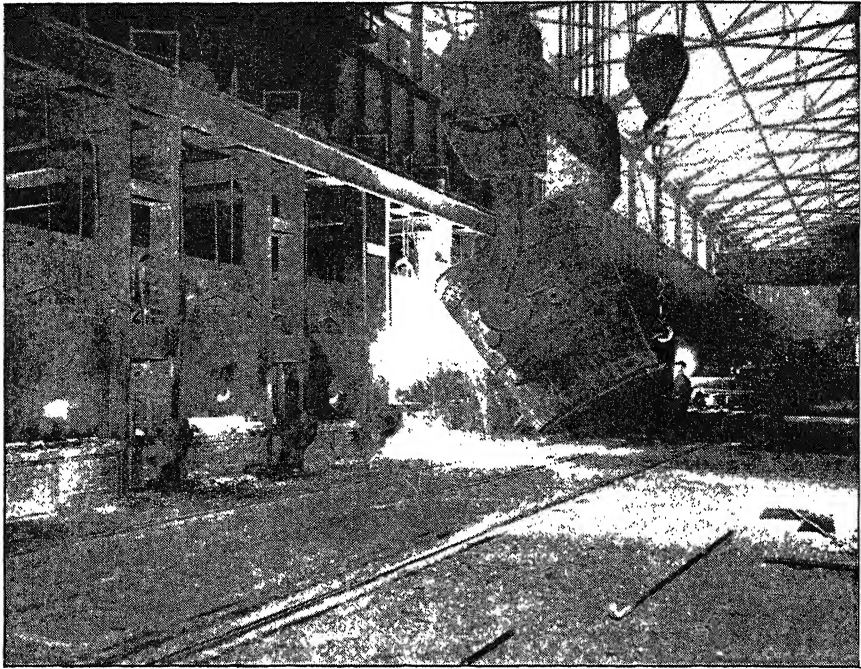


Courtesy Kaiser Company, Inc.

Steel, all thicknesses and sizes, is neatly stored at Kaiser's Swan Island shipyard in Portland, Oregon. Huge cranes pick up this steel and transfer it to the plate shop where it will be cut and shaped. The finished pieces are welded into prefabricated units before their journey to the ways.

siderable use of iron and other metals. But even in medieval times iron was used chiefly for weapons and armor. Gradually various implements and tools were shaped from iron; but its use was very limited until about a century ago. Plows had only a small iron blade, and the first railroads ran on rails of wood covered with a thin strip of iron. Cogwheels in mills and even in clocks were made of wood, and so were spinning wheels and looms.

In those early days iron ore was obtained mostly from bogs and swamps and was smelted in wood or charcoal fires. Under such conditions the output of iron was small. Iron was made wherever the ore was found, and, when the supply was exhausted in one locality, the furnace was moved somewhere else. When coke began to be used for smelting, the output of iron immediately increased. The ore was transported to the coal-mining centers and the iron-making industry became localized there. As machines were invented and as railroads were extended, more iron was required and the production soon grew very large.

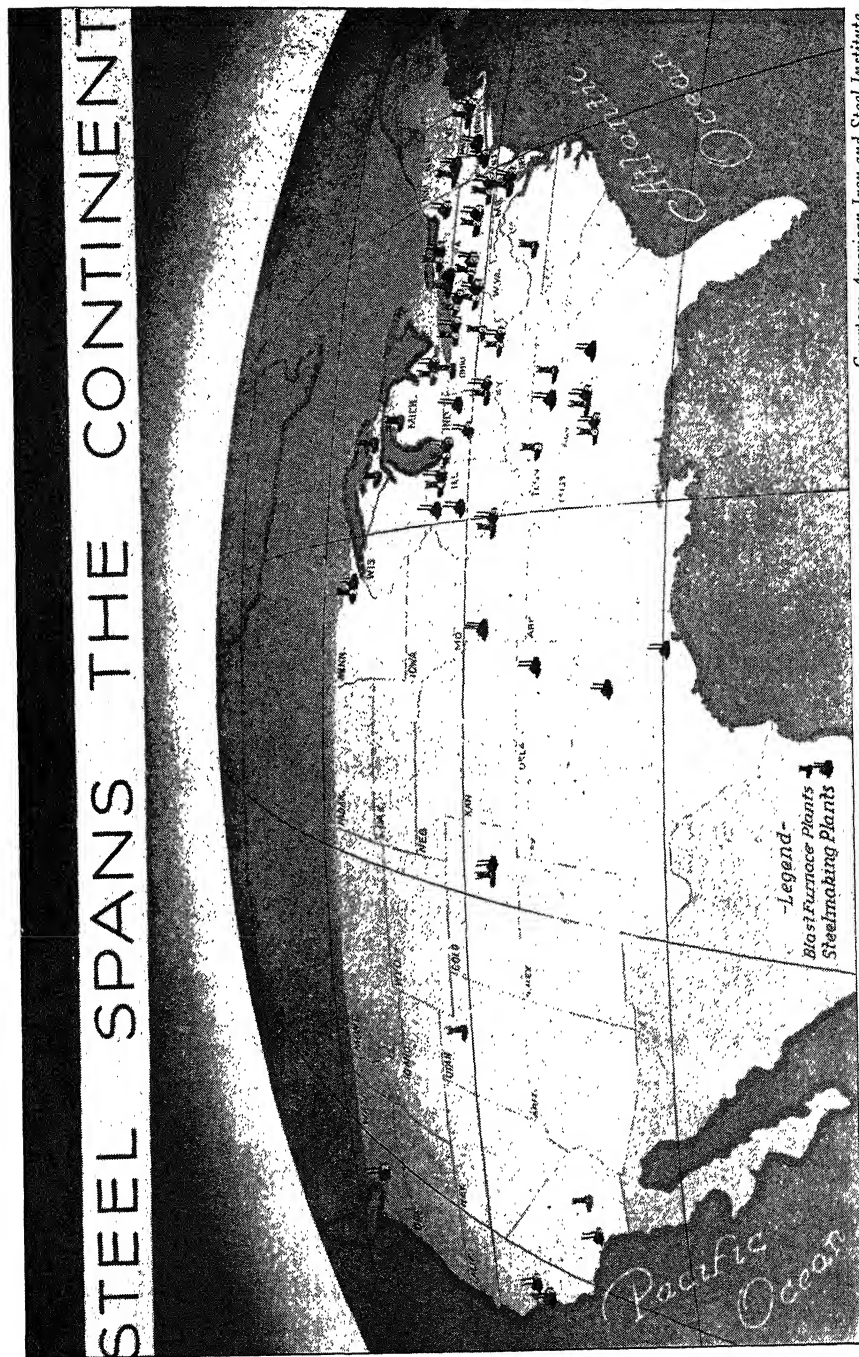


Courtesy Bethlehem Steel Co.

Pouring a ladle of pig iron into an open-hearth furnace where it is refined into steel

Our dependence on iron and steel. Iron and steel, which is made from iron, are indispensable in modern life. Every manufactured product that helps to feed, clothe, and shelter us goes through machines constructed almost entirely of steel. Furniture, household articles, vehicles, and conveniences of all kinds are either made from iron or steel or are produced by machines of steel. From the delicate compass needle and the compact works of a watch to the enormous bulk of a great steamship, iron and steel find constant use. The machine age would be impossible without this commonplace but marvelous metal. Neither water power, nor steam, nor electricity would be of much use without iron and steel in engines, machines, and buildings.

The qualities of iron and steel. When iron ore is smelted, or heated with coke and limestone, the liquid iron is poured out into molds where it hardens. In this form it is called cast iron or pig iron. The name *pig iron* is applied to these molds of iron because they resemble a number of little pigs lying side by side. Cast iron is run into molds to make stoves, heaters, and parts of machines called *castings*. Cast iron is hard but very brittle, which means it



Courtesy American Iron and Steel Institute

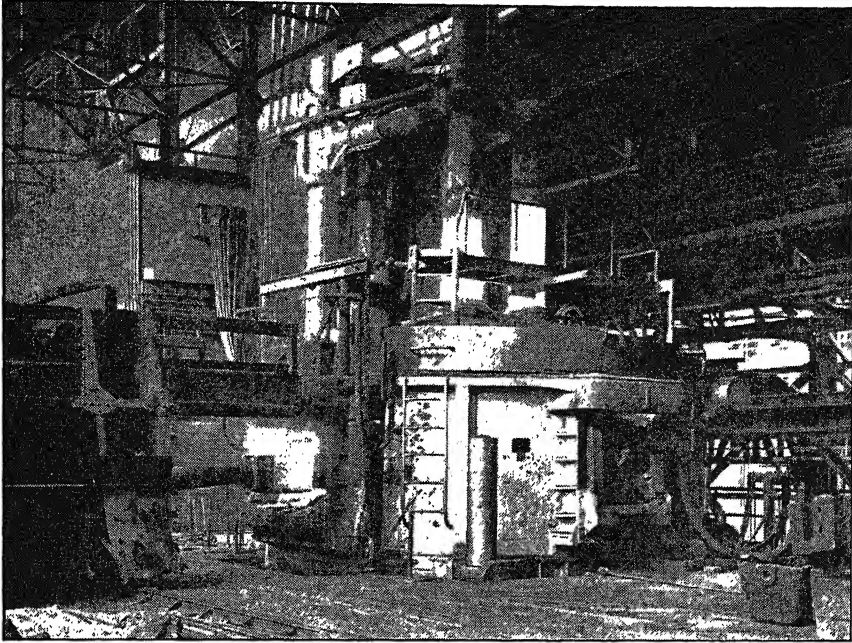
We are fortunate indeed in having plants producing steel entirely across the country. There is no industry which does not require steel whether in the city or in the country.

breaks easily. It contains a great deal of carbon. In order to make the iron less brittle so that it can be rolled and shaped into various forms, most of the carbon is burned out of it. Iron thus treated is called *wrought iron*. Such iron is also called *malleable iron*. It may be rolled into sheets of varying thickness, from which tanks, boilers, and other products are made. All sorts of ornamental ironwork are made from wrought iron.

Steel is harder than wrought iron, but it contains less carbon than pig iron. It can be cast or rolled like wrought iron, but it is far more durable. Tools, machines, girders, rails, engines, and steamships are mostly made of steel. By alternate heating and cooling steel can be tempered to varying degrees of hardness. When very hard, steel becomes brittle; but it then takes a very fine cutting edge and so is valuable for tools and implements of all kinds. A very important quality of iron and steel is that they can be magnetized, that is, electrically treated so that they will attract and hold other iron objects. This magnetic quality makes the compass possible. Great magnets are also used to lift heavy masses of iron and steel in loading and unloading ships and trains and in moving castings in machine shops. Today magnets are playing a truly dramatic part in the raising of sunken iron vessels. Thus we see that iron and steel fill a great variety of human and mechanical needs.

Special steels for special uses. Other elements added to steels produce *alloy steels* and give the desired qualities for the many uses to which steel is put. Tungsten is one of the most important of the metals added. The chief use of tungsten steel is in making hard-edge machine tools which work at high speed. The filaments in our electric lamps are made of tungsten. Chrome steel, that is, steel containing chromium, is used in making ball bearings, hard-edge tools, burglarproof safes, and stainless steel. A little nickel added to steel makes it much harder and tougher. Such steel is used in making armor plate for naval vessels and for parts of machinery. Everyone knows this metal in nickel plate and in coins. In fact, the metal has given its name to one of our coins. Canada furnishes nearly all the world's supply of nickel. Chromium has largely replaced nickel for plating.

Another of the substitutes for nickel is Allegheny metal. It is an alloy of the finest steel with chromium and nickel. This metal will not rust, tarnish, or scratch easily. The bright parts of some of the newer automobiles were made of Allegheny metal. One automobile manufacturer alone used 1000 tons a month. The metal trim-

*Courtesy Bethlehem Steel Co.*

An electric furnace for making alloy and other special steels

nings of the Empire State Building and the Chrysler Building in New York City—the two tallest buildings in the world—are of this metal.

The different parts of an automobile require different kinds of alloy steel. The frame of the car is often made of nickel steel; the valves are of steel containing chromium which resists burning by the hot gases; the steel of the springs usually contains manganese which makes them more elastic; and the ball bearings are of chrome steel which is noted for its hardness. The steel needed for parts of airplanes, trucks, tanks, and ships is also prepared according to the special use to which it is to be put.

Sources of some metals. Normally we produce about one half the vanadium used; the other half is imported from Peru. The major part of our nickel comes from Canada, the world's greatest producer of that metal. Smaller quantities formerly came from New Caledonia, Russia, and Greece. In peacetimes chromium ores came to us from Rhodesia in South Africa, Turkey, Cuba, the Philippine Islands, and New Caledonia. Tungsten was imported from China, Bolivia, Argentina, Australia, and Portugal.

Some of the regions which supplied us with strategic metals are

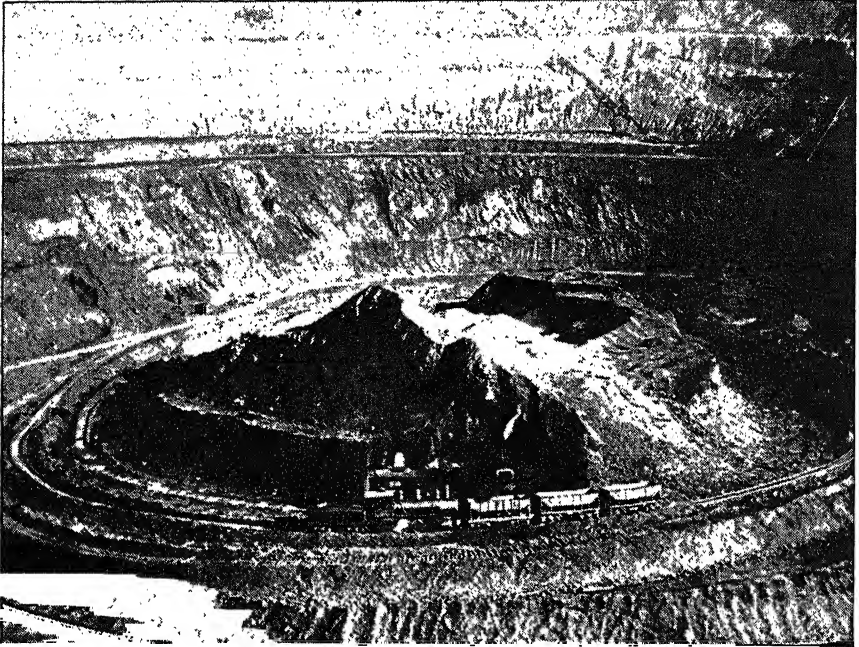


Photo from Keystone View Co.

An open-pit iron mine in Minnesota. The ore is so soft that it can be scooped up by steam shovels and dumped into cars which take the ore to the docks at Duluth for shipment. Compare this illustration with the one on page 163.

now controlled by the Axis. From other regions lack of shipping makes it difficult to transport ore or metals. These restrictions compel our manufacturers of war implements to use less, to use substitutes, or even to do without.

IRON ORE

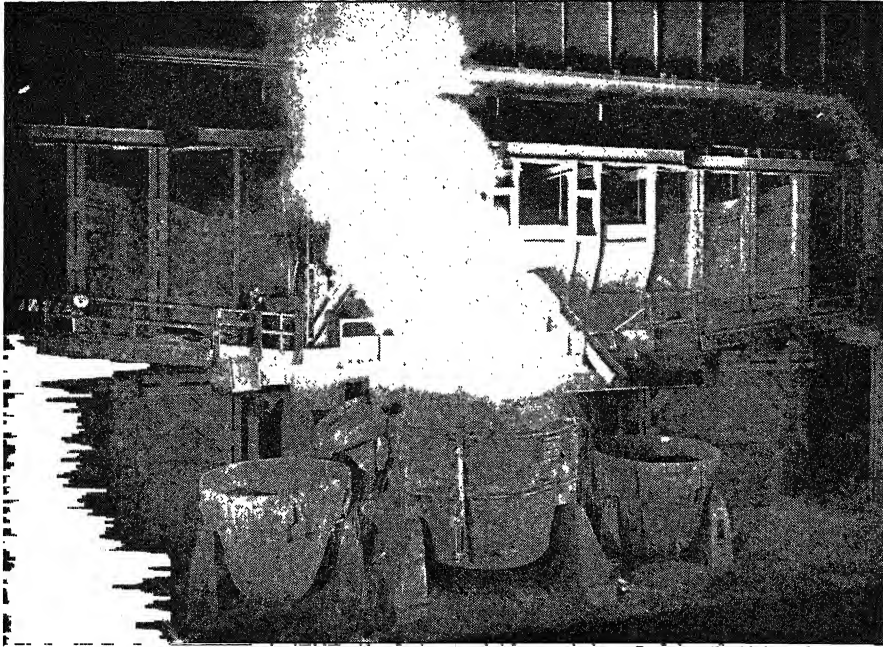
Where iron is found. Iron is very common in the soil and rocks of the earth's surface. We are all familiar with the red rust which appears when iron is exposed to the air and moisture. This rust is caused by the oxygen of the air combining with the iron. The iron in the soil is thus oxidized and the resulting rust gives the soil and rocks in many places a reddish-brown color. Some rivers are discolored by iron-bearing soils. However, in order to be worth using for iron production, soils and rocks must have a large iron content. Such deposits are called *iron ore*. Nowhere is iron found as pure metal, unmixed with soil or rock. Sometimes iron ore is in hard layers, deeply imbedded in other rocks. In other places it is found in beds of loose soil very close to the surface.

The Mesabi Range. Ninety million tons of iron ore per year pass over the Great Lakes in wartime. Owing to the urgency of the war, transportation opens on the Lakes earlier in the spring and closes later in the fall than in peacetimes. In the Mesabi Range in Minnesota great quantities of iron ore lie only a few feet under the surface. In the Mesabi Range is an open pit three miles long, one mile wide, and nearly four hundred feet deep. The first load of ore from this great pit reached Cleveland a little more than fifty years ago. Without the enormous quantity of ore supplied from Mesabi the outstanding industrial growth of our country would have been impossible.

It has been suggested that the open-pit mines of Michigan and Minnesota may become exhausted in the next ten years. Then we shall be obliged to depend on underground mines for our major supply. Already engineers are looking the country over and even to foreign lands for a future supply. Countries in North and South America known to have large deposits are Mexico, Brazil, and Canada. If the time ever comes when our iron ore comes from overseas, it is more than likely that coal or coke and iron ore will find their meeting place along the Atlantic Coast where iron has been smelted on a small scale for many years.

The making of iron and steel. The smelter is the place where the iron is separated from the other materials with which it is combined in the ore. This smelting is done by dumping iron ore and limestone into great furnaces of burning coke. The ore melts and the limestone attracts the rock and other impurities, leaving the pure liquid iron to be run into molds or to be converted at once into steel. There are two chief methods of making steel. The Bessemer process consists in forcing hot air through the liquid iron to remove its carbon. Sometimes more carbon has to be added to the steel to produce the desired quality of hardness. In the open-hearth method intensely hot flames are driven into the mass of iron until a sufficient amount of carbon has been burned out. Open-hearth steel is considered the best, and this process is the most commonly used in the United States.

Iron production in the United States. The United States usually produces annually about a third of all the iron and steel made in the world, and more than twice as much as the production of any other country. This large production is due to our great supplies of iron ore and coal, all conveniently located. The ore at the western end of Lake Superior is carried by rail the short distance to the docks at the lake ports. From elevated pockets at the docks the ore drops through chutes into the holds of the ore freighters. These lake



Courtesy Bethlehem Steel Co.

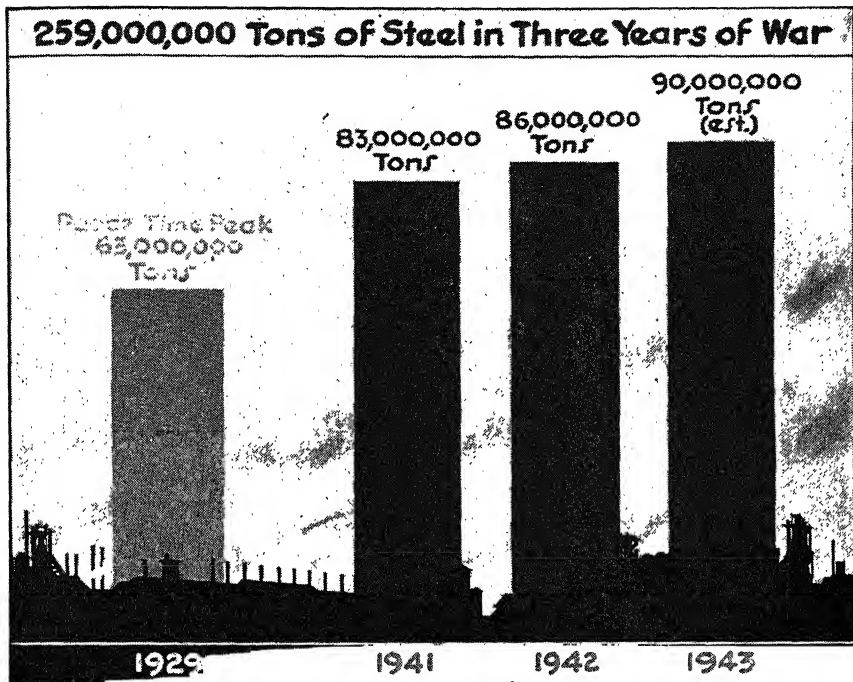
Steel flowing into a crucible from an open-hearth furnace. Compare this illustration with the one on page 218.

steamers are specially designed with great cargo capacity and numerous openings in the deck (hatches), through which ore, coal, or wheat may be poured rapidly into the holds. It takes only a few hours to load one of these ships.

When the ore reaches the ports on the southern shores of Lake Michigan or Lake Erie, it is taken from the holds in great buckets which empty a whole shipload in a short time. On their return trips the lake steamers carry huge cargoes of coal. This water route between the iron mines and the coal regions makes the transportation cost much cheaper than it would be if the ore had to be carried all the way by rail.

Pittsburgh as a steel center. Pittsburgh has several advantages for steel manufacturing. It is in the center of a great soft-coal region. This coal is made into coke for use in the smelters. Much of the coke comes down the Allegheny and Monongahela Rivers to Pittsburgh. Other coal is brought in by rail, but none of the fuel has to be carried very far. Thus the freight charges are low.

In the early days of the steel industry the iron ore was obtained from the small deposits near Pittsburgh. Farmers mined the ore on



Courtesy American Iron and Steel Institute

Note the increase in the use of steel with every year of the war. List the wartime uses of steel.

their lands in their spare time and hauled it to the smelters in the city. But the rapid growth of the industry soon made this local supply of ore insufficient, and ore began to come in from the Lake Superior region. The opening of the Soo Canals in 1885 gave a cheap water route direct to the Pennsylvania smelters. Thus Pittsburgh has an unlimited and easily secured supply of ore.

Another advantage which Pittsburgh enjoys is its position near the great industrial centers of the East. A great network of railroads connects Pittsburgh with these markets for its iron and steel products. The automobile, tractor, and other heavy industries of the Middle West also took great quantities of iron and steel. Now, even greater quantities are being used for airplane engines, trucks, tanks, and ships. The deepening of the Ohio River has given Pittsburgh an excellent water route to the entire Mississippi Valley. Expert management and skilled labor have also helped to keep Pittsburgh our leading steel city.

The Great Lakes steel region. Several Great Lakes cities are prominent steel producers. Among these are Cleveland and Buffalo on Lake Erie, Gary and South Chicago on Lake Michigan, and

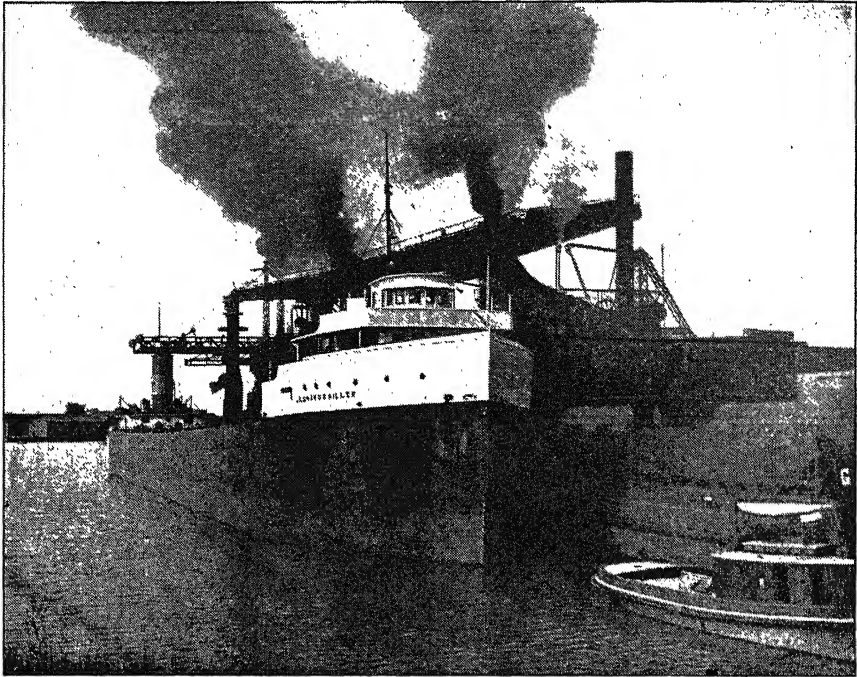


Photo by James Sawders

Unloading iron ore from a lake boat at Huron, Ohio. Great clamshell buckets dip deeply into the hold of the ship and pick up tons of ore at a time.

Duluth on Lake Superior. These cities are much closer to the iron mines of Minnesota than is Pittsburgh; but they must get their coal from a greater distance. Since it requires more coal than ore to smelt iron, it is cheaper as a rule to transport the ore to the coal than to bring the coal to the ore. That is one reason for Pittsburgh's leading position in the steel industry. All the Great Lakes cities are at a disadvantage in this respect; but cheap water rates help them to get their coal at a low price. Also these cities are very close to the great industrial centers of Indiana, Ohio, and Illinois, where their steel is in great demand.

Birmingham, a Southern steel center. An important iron and steel region is located at Birmingham, Alabama. Less than seventy years ago the region was still a cotton field. Birmingham has unusual mineral advantages. A thick bed of iron ore projects from one side of the valley for a distance of twenty-five miles while on the other side is an abundant supply of coking coal. The ore itself contains all the limestone needed for smelting. Labor has been cheaper there than in the North. Birmingham is too far south to compete with

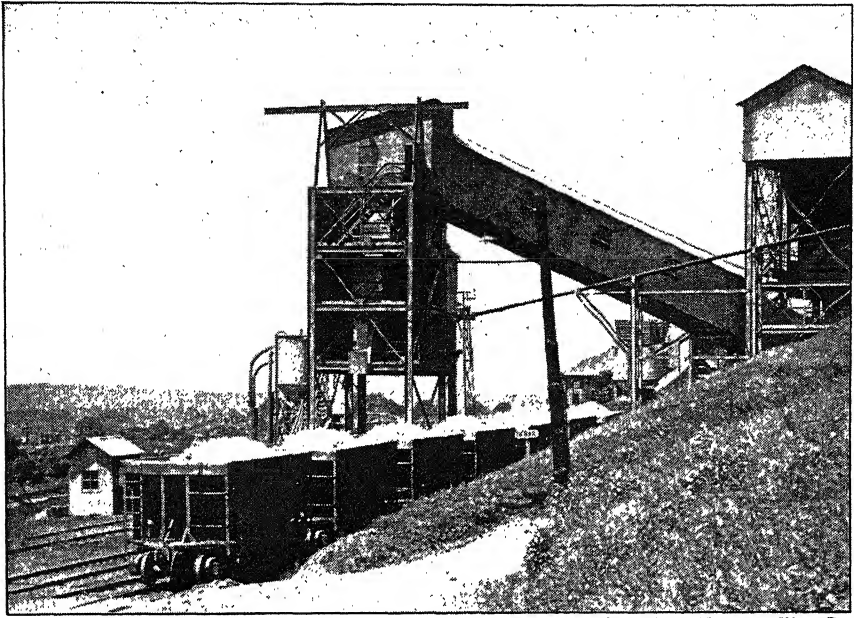


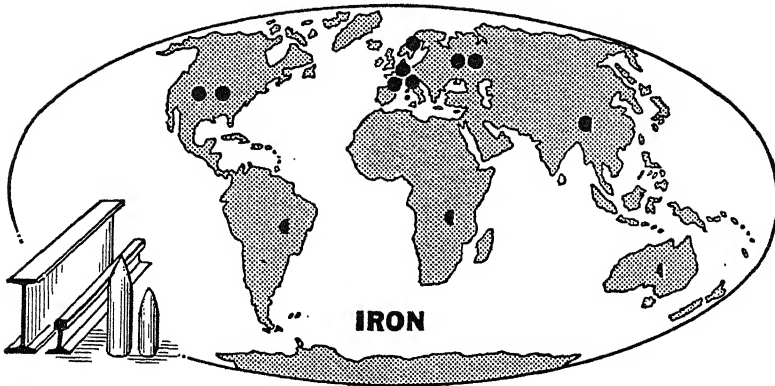
Photo from Keystone View Co.

Limestone in addition to coke and ore is needed for smelting iron. In the building at the right the limestone is ground; it is then carried on a belt conveyor to the machine above the cars where it is sifted, and then it is transported to the smelter. This tipple is near Birmingham, Alabama.

the northern steel centers for the markets of the northeastern United States. It is, however, an important center for war industries. Iron and steel from Birmingham moves to the coast through Mobile by way of the Black Warrior River, which has been greatly improved recently by the building of locks and dams. With the large development of airplane plants and shipyards on the Pacific Coast steel mills have been established in California and Utah.

What iron does for a nation. Gibbon, a great historian, said, "The control of iron soon gives a nation control of gold." But the control of iron requires also the possession of coal, without which the ore is much less valuable to a country. The nation which can make iron and steel has a great advantage. Equipment for farms, machines for mills and factories, rails and rolling stock for railroads, and ships for rivers, lakes, and ocean all require steel. Iron and steel are, of course, indispensable in time of war.

A country with a large iron and steel production has a great commercial advantage. It can build its own ships and railroads. It can manufacture all sorts of articles, large and small, many of which become valuable items in foreign trade. Before the war our prod-



Each full dot represents ten per cent of world production.

ucts were sold all over the world. The profit from this world trade in iron and steel increased the demand in our own country for food, clothing, and many other articles. With the wealth which came from manufacturing and trade, we were able to buy extensively from other nations, importing their products in exchange for our own. Iron is indeed a great source of wealth.

The world's iron. Iron ore is plentiful in Europe, and it is found in all continents. Next to the United States, France mined the largest quantity of iron ore but did not have enough coal to take full advantage of its production. Germany produced much more pig iron and steel than France and was second to the United States in this respect, but it had to import a great deal of iron ore. The annexation of former Austria and of Czechoslovakia greatly increased Germany's iron-ore resources. Germany's great coal region in the Ruhr Valley was the center of the steel industry. Great Britain ranked next to the United States, Germany, and Russia in pig-iron production, but like Germany it had to import a part of its iron ore. Great Britain is rich in coal, which accounts for its prominence as a steel producer.

OTHER METALS AND MINERALS'

MANGANESE

Needed in making steel. Manganese is one of the most vital of strategic materials. Almost twelve pounds are used in making each ton of steel. It helps to remove sulphur from the iron and to prevent oxidation. Ninety-seven per cent of the manganese used in this country is imported. The United States possesses large deposits of low-grade ore of manganese; only small deposits of high-grade ore.



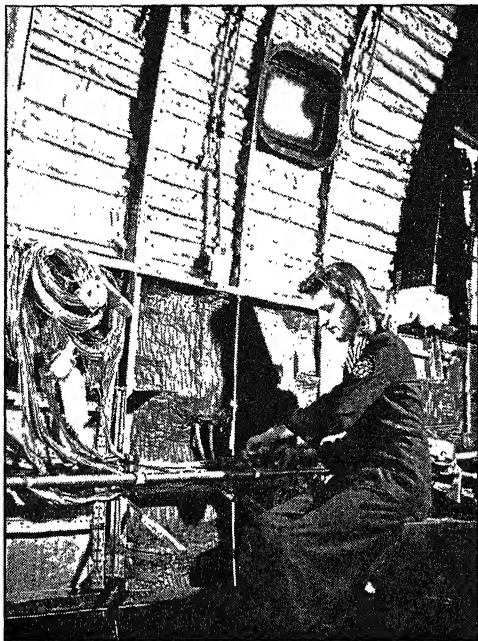
Courtesy "Life"

A miner putting dynamite into a drill hole to loosen manganese ore

The countries from which we receive our imports in peacetimes are the Gold Coast of Africa, Russia, Cuba, British India, the Union of South Africa, and Brazil.

COPPER

The uses of copper. Copper ranks next to iron as the world's most useful metal. It is indispensable in the use and transmission of electricity. This is because it is an excellent conductor of electricity. Consequently all electrical machines, appliances, and transmission lines use copper wire, which is flexible, durable, and inexpensive. Copper is an important part of the ignition systems of automobiles, aircraft, tanks, and trucks. Another important use for copper is in the making of alloys, which are mixtures of different metals. Brass, for instance, is an alloy of copper and zinc. It is used in hardware and forms a part of many machines, clocks, and implements. Bronze, an alloy of copper and tin, also has many uses; it was known by ancient peoples before iron came into general use.



Courtesy Consolidated Vultee

This young woman is helping wire an airplane. A woman's small hands and deft fingers are well adapted to this complicated work. Note the sound-proofing material (kapok) in the wall of the fuselage at her right.

In automobiles copper wire is used in generators and in self-starters; it is used to supply the ignition spark in each cylinder, in the lighting system, and to connect the battery with the various parts of the instrument board. It finds a similar use in trucks, tanks, aircraft, and ships. Besides these indispensable uses, it enters into the manufacture of guns and firearms of all kinds.

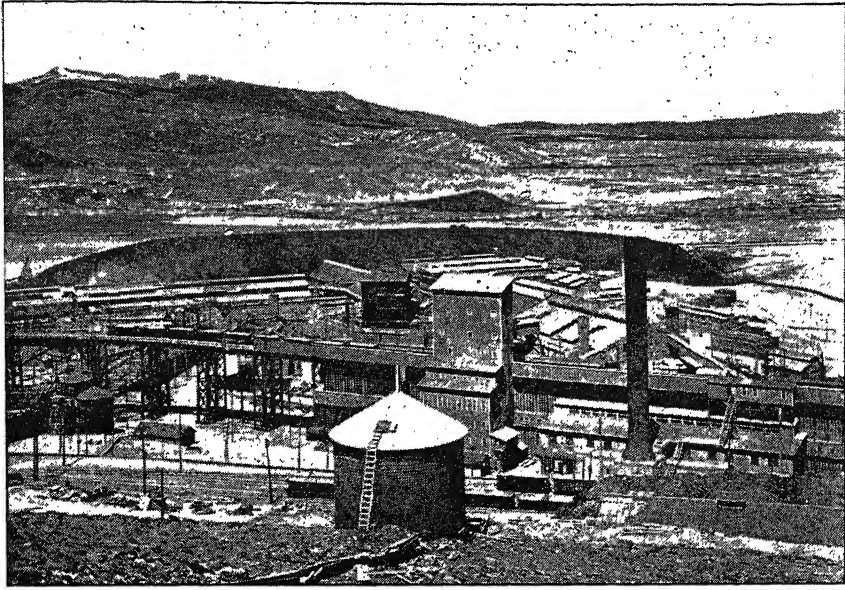
Copper is used not only to destroy life but to save life. On the one hand, it is used as jackets for bullets, and, on the other, it is used in the manufacture of X-ray machines, which aid in locating bullets and shrapnel in wounded soldiers.

Ever since the establishment of our currency system, until the present year, our pennies, like such coins in other countries, have been made of copper. In the year 1942 one and one-half million pennies were minted. To conserve the 4600 tons of copper used in their coinage, pennies were made of steel coated with zinc. That saving alone supplied copper sufficient for use in building 14,000 pursuit planes. Public protest caused the abandonment of this scheme.

Because war requires so much copper, it is almost impossible to obtain for civilian use any article made of copper or an alloy of copper. The Telephone Company is also obliged to conserve copper. They say to us, "Do not ask to have a new telephone installed. Do not make a long distance call unless absolutely necessary. Lines are needed by the armed forces and copper cannot be spared for stringing additional wires."

Our attitude toward all strategic materials should correspond with what was said to be the late President Coolidge's motto: "Eat it up; wear it out; make it do; do without."

Other uses of copper: light bulbs, valves and fittings, oil-burner



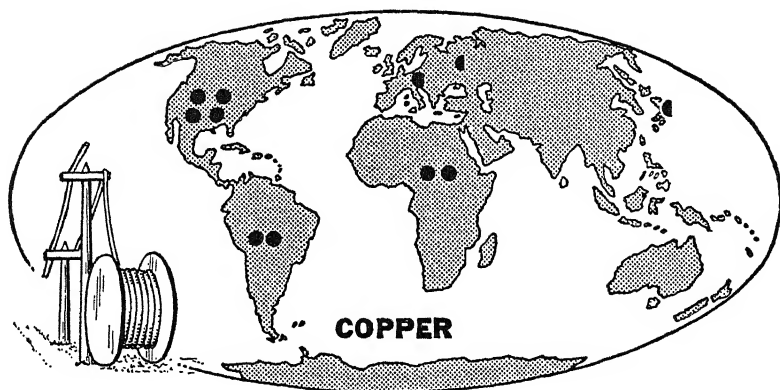
Courtesy "Life"

Anaconda copper smelter. A Boeing Flying Fortress uses 3000 pounds of copper and a battleship 1000 tons.

tubing, wire cloth, inner-tube valve stems, kitchen-range boilers, water meters, thermostats, washing machines, water heaters, and fire extinguishers.

Early American uses. The early American colonists first used copper for kettles and for covering the bottoms of their wooden ships. The chief use for brass in those days was to make brass buttons, which were very common on men's clothing. Copper was first mined in the United States in the Connecticut Valley, and the brass industry which started in the Naugatuck Valley in Connecticut still leads in the value and variety of its products. Bridgeport, Waterbury, and the surrounding towns manufacture a third of the brassware and a fifth of the watches and clocks made in the United States. This region is now engaged in producing war material that calls for great precision and accuracy.

Copper regions of the United States. When the demand for copper became so great that the Eastern States could not supply a sufficient quantity, the metal was imported from Chile and Cuba. Later copper was found in a pure state in Michigan, and soon other Western States discovered valuable deposits. The leading states in copper production are now Arizona, Utah, Montana, and Nevada.



Each full dot represents ten per cent of world production.

Arizona alone produces about one third of the total production of the United States.

World production of copper. While the world production of copper varies greatly from year to year, it is much larger today than it was fifty years ago. Can you see any reason for an increased demand for copper? At present the United States produces about one third of the world's copper. Other leading countries in copper production are Chile, Canada, Rhodesia, and the Belgian Congo. The United States not only produces more copper than any other country; it also does a great business in refining copper ore brought from other countries. Much of this ore is partially refined before coming to our refineries, which are located in the large eastern coast cities near our great industrial centers. From these refineries copper is sent to our own manufacturing cities and also formerly was exported to the industrial centers of Europe.

GUIDES TO STUDY

1. What are the most important raw materials needed for our defense industries? Why are we using them up at such a rapid rate?
2. How does the location of raw materials affect their value?
3. What were the early uses of iron? How was it smelted?
4. Show that practically everything we use is made with the help of iron and steel.
5. What are the different kinds of iron?
6. What are the qualities and the use of cast iron? Wrought iron? Steel?
7. What are the different *alloy* steels and what is the use of each?
8. Why does an automobile require different kinds of steel?
9. What is iron ore and where is it found in this country?

10. Describe the way in which the ore is transported from the mines to the smelters.
11. How is iron ore smelted?
12. Why did Pittsburgh become the greatest iron and steel center of the country?
13. What cities on or near the Great Lakes are steel centers? What are the advantages of their locations?
14. Why did Birmingham become the great steel center of the South?
15. How has steel contributed to our country's wealth and strength?
16. What other countries are large producers of iron and steel?
17. What is the principal use of manganese and where does it occur?
18. List the many uses of copper.
19. What were the uses of copper in colonial days?
20. Why is copper one of the most useful of metals?
21. What are the chief copper-producing states of our country?
22. What foreign countries produce much copper?
23. In what ways are plastics coming to take the place of steel and other metals?
24. How may inventions and new methods change the values of raw materials?

TOPICS FOR CLASS DISCUSSION

1. Our future supply of iron ore.
2. How iron ore is mined.
3. The Bessemer process.
4. The open-hearth process.
5. How iron ore is smelted.
6. The uses of steel.
7. How coal and iron are dependent on each other for their usefulness to man.
8. Ways in which you are dependent upon iron or some of its forms; upon copper.
9. How the varying degrees of hardness in steel are obtained.

WORK TO BE DONE

1. On an outline map of the United States indicate the locations of our great iron mines. Trace the routes which the ore takes from mine to smelters. On the map print in the proper places the names of the cities which receive and smelt the iron ore.
2. Make a special study of the history and importance of the Soo Canals.
3. Choose members of the class to study and report on the cities of Duluth, Pittsburgh, and Birmingham.
4. Show how important iron and steel are in the production of food; in the building of houses; in the production of clothing.
5. On a map of the world locate those countries which produce large quantities of iron and steel.
6. Obtain statistics on the amount of iron produced by leading countries. From these figures prepare a graph illustrating the same facts.



Courtesy Wright Aeronautical Corporation

Aluminum is used for many parts of aircraft engines because it is light and strong. Here a foundry man is pouring molten aluminum into a sand mold for a Cyclone engine cylinder head.

ALUMINUM

Until the outbreak of World War II aluminum was in very common use. Kettles and pans of all kinds were made of this light, silvery metal, and they were very reasonable in price. Such articles wear longer than those made of tinned iron, and they will not rust. Aluminum is also an excellent conductor of electricity and enters into the construction of many electrical appliances. On account of its light weight it is extensively used in the bodies and engines of automobiles, airplanes, and dirigibles. The streamlined trains are partly of aluminum construction, which adds to their speed and carrying capacity. Various alloys contain aluminum to reduce their weight. Powdered aluminum is used in paint, and new uses are constantly being developed.

Aluminum in airplanes. With the increased production of airplanes the demand for aluminum became much greater. Three fourths of a modern military plane is aluminum or alloys. The wings are made almost wholly of aluminum; nearly two thirds of the engine and all of the propeller are made of the same metal. It also enters into the construction of many of the smaller parts, such as rods, bolts,

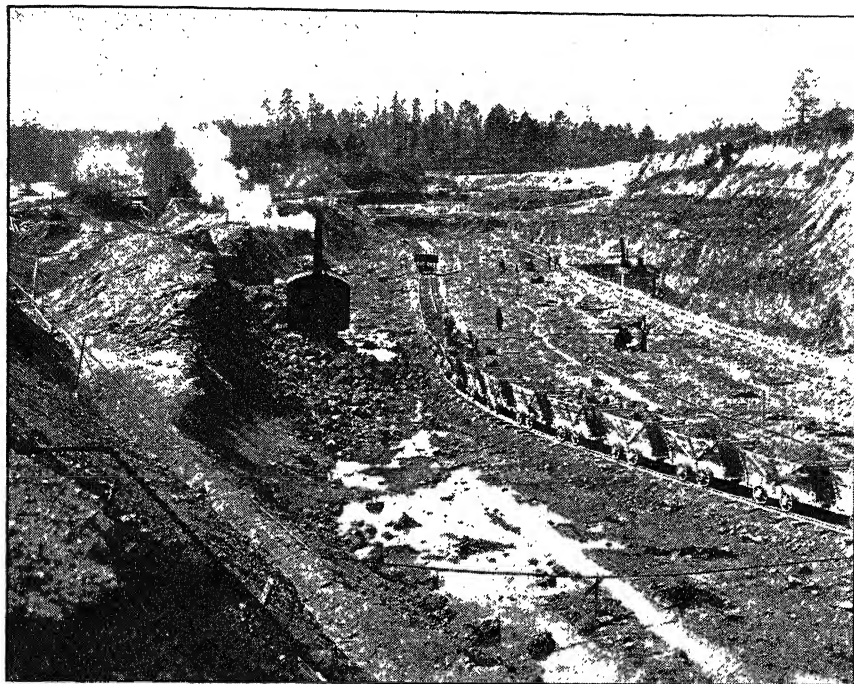


Photo from James Sawyers

A bauxite mine in Arkansas. From the mine the ore goes to East St. Louis where it is partially refined. The alumina (aluminum oxide) is then taken to places where electricity can be generated cheaply and there the aluminum itself is finally extracted.

and nuts. If aluminum were more plentiful, even larger quantities of it would be used in a plane, thus making it lighter and capable of making greater speed.

Sources of aluminum. Aluminum is a new metal as far as its common use is concerned. It is very widely distributed in rocks and soils, but until recently it was very expensive to extract the metal from the ores. As late as 1850 aluminum cost thirty dollars per pound, and very little was produced. When cheaper methods of production were found, the price fell rapidly and in recent years this metal has sold as low as twenty cents per pound. This low price of course caused a greatly increased demand for aluminum and accounts for its widespread use today. Most of our aluminum now comes from a mineral called *bauxite*. This is a bulky substance from which much of the waste is removed before the ore is sent to the aluminum plants. These plants treat the purified ore and from the crude bauxite is obtained alumina, an oxide of aluminum. One of the leading cities for this work is East St. Louis, which receives the bulky bauxite by rail from near-by states and from British Guiana and Surinam by

way of the Mississippi River. Aluminum is separated from alumina by means of an electric current.

The largest of the older aluminum plants in North America are at Niagara Falls, New York; at Messina, New York, on the St. Lawrence River; at Alcoa, Tennessee; at Badin, North Carolina; and at the Shawinigan Falls of the St. Maurice River in the province of Quebec. These places all have abundant water power for the generation of electricity.

New plants. A new plant was established near the Bonneville Dam in the state of Washington which produces 60,000,000 pounds per year. Another plant was set up at Vancouver in the same state. Up to July, 1940, there was not one plant producing aluminum west of the Mississippi River. It is expected that from now on one third of the country's output will come from the Pacific Northwest. The largest aluminum plant now under construction is located near New York City. Large cities are usually near great sources of power.

By the end of 1943 the United States had a productive capacity of aluminum of more than two billion pounds per year. This quantity of aluminum would rebuild three times every railroad car in the United States or put thirty aluminum cooking utensils in every home. The electricity needed to produce this quantity of aluminum would in one day furnish enough power to supply 60,000 homes for one year.

The United States now produces more aluminum than all the other countries combined. The countries leading in the production of bauxite are France, Hungary, the United States, Surinam, Yugoslavia, and Italy. The United States and Canada import considerable quantities from British Guiana and Surinam.

MAGNESIUM

A light metal. Magnesium possesses much the same properties as aluminum except that it is much lighter. It is one of the lightest metals known. It has been said that the world has passed through the stone age, the bronze age, the iron age, and that we are now at the beginning of the "light-metal age." The use of these light metals either alone or in combination with others makes possible lighter airplanes and motor cars. The lighter the planes, the greater the possibilities for speed and climbing power. Magnesium used in the manufacture of large motor buses and trailers reduces the weight of the vehicle by four or five tons. The less the weight of a steam



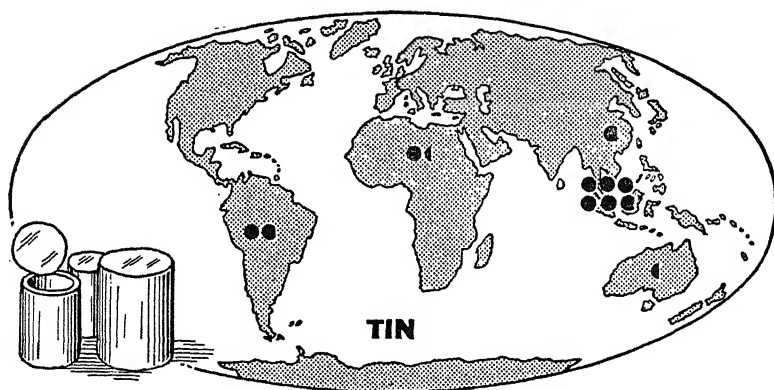
Courtesy "Life"

Sparkling crystals of pure magnesium clinging to lid and side of the retort

shovel, the more stone or gravel it can lift. The less the weight of an ordinary shovel, the more earth or soil a workman can lift at each stroke.

Before World War II there was only one plant in the country producing magnesium. Before long there will be ten such plants. The production of the metal in 1938 was 6,433,000 pounds, in 1942 it was 76,500,000 pounds. The War Production Board has asked for an annual production of 725,000,000 pounds.

Magnesium is obtained in several ways. In Michigan it is extracted from brine pumped from wells. On the coast of Texas it is obtained from sea water by electrolysis. It is claimed there is enough



Each full dot represents ten per cent of world production.

of the metal in one cubic mile of sea water for four million Flying Fortresses. Magnesium is also obtained from an ore of that metal found in Las Vegas, Nevada, not far from Boulder Dam. The metal is extracted from the ore by the use of electricity generated at the dam.

Besides its use in making airplane parts, magnesium is used in making photographic flashlights and in incendiary bombs. It is claimed that eighty per cent of the destruction wrought in England has come not from the huge explosive bomb, but from the fires caused by the comparatively small magnesium bomb. Airplane engines and propellers require sixty-four per cent of all the magnesium produced; airplane wheels use another nineteen per cent; and airplane frames seventeen per cent. Into each airplane made goes more magnesium than was produced in 1914. In ammunition magnesium enters into the composition of tracer bullets which help to locate the target.

TIN

Uses of tin. The use of tin in making bronze has been known since ancient times. It is said that the Phoenicians, a Mediterranean people, ventured as far as the British Isles in quest of this valuable metal. The mines of Cornwall in England were for a long time the chief source of tin. British Malaya, Netherlands Indies, and Bolivia formerly accounted for two thirds of the world's supply.

Tin is used chiefly as a coating to cover thin sheets of iron or steel which are then called *tin plate* and are used in making cans for food products. Terneplate has some lead mixed with the tin coating and is used principally as roofing material. Tin is used in automobiles in the engine bearings and in the solder connecting the radiator tubes.

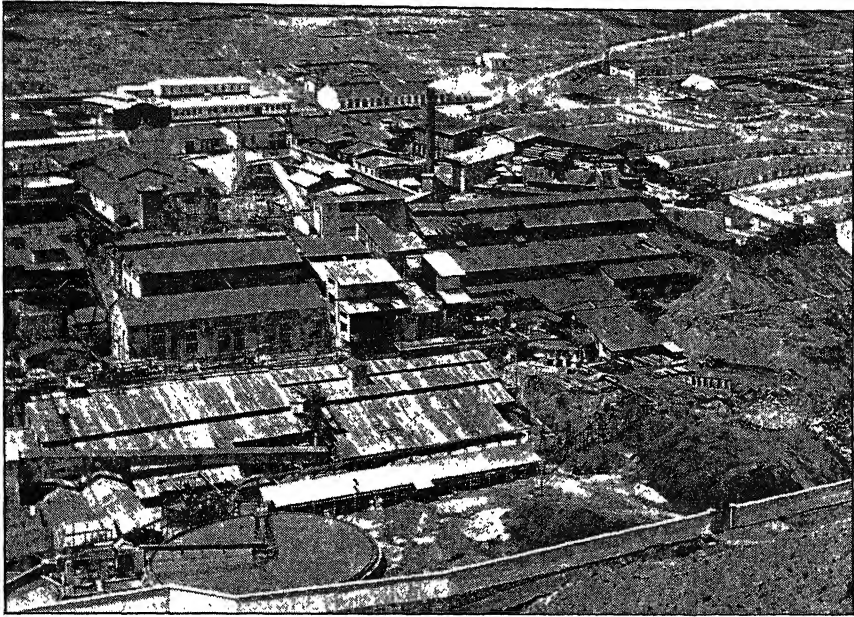


Photo by James Sawders

A village of Bolivia in the High Andes. Here is located the largest tin mine in the world. The owner is Señor Patino, one of the world's richest men, who makes his home in New York City and seldom sees his valuable property.

Tin is needed in the manufacture of airplanes, trucks, tanks, and guns. With the capture by the Japanese of the tin-producing regions of the Far East, more than three fourths of the world's output of tin was brought under their control. For this reason the supply of tin for use in the United States has been greatly reduced.

Sources of tin. The United States produces practically no tin. With the exception of the stockpiles accumulated before the outbreak of World War II we are almost dependent upon what Bolivia can supply us. To refine this imported tin the Federal Government has constructed a plant at Texas City, Texas. Up to this time all imports came to us as refined tin.

Saving tin. Various means are used to make the smaller amount of tin go as far as possible. Formerly in making tin cans it required one and one-half pounds of tin to coat one hundred pounds of thin steel sheets by dipping them in molten tin. Now by an electroplating process the same quantity of steel is coated with only one-half pound of tin. An even covering of this very thin layer of tin is insured by an electronic equipment similar to that used in the radio.

Glass and, wherever possible, cardboard is being used for containers. Other metals, including silver, are being used as substitutes

for tin in manufacturing. Tin cans are carefully collected and returned as scrap so that the tin may be used again. When a person bought a tube of toothpaste or shaving cream, he was for a time required to return an old tube.

LEAD

One of our most useful metals is lead. *White lead* is a compound used in paints; and *red lead* is used to protect iron and steel from rust. Practically all ironwork is painted with red lead before the finishing colors are applied. In plumbing lead pipe and solder play important parts. Pewter is an alloy of tin and lead and was formerly used extensively for tableware. This old pewter ware has become so scarce that it is prized as antique and is now being imitated by the reproduction of old designs. Other uses for lead are in type metal, in bullets and shot, in storage-battery plates, in protective cable covering, and in various electrical appliances.

Our leading lead-producing states are Missouri, Idaho, and Utah. The United States produces more lead than any other country, its output amounting to about one fourth of the world total.

ZINC

Zinc is particularly useful in galvanizing. This process consists in coating the surface of iron or steel with molten zinc. The zinc prevents the iron from rusting and therefore makes it weatherproof. Galvanized-iron sheets are used to cover many temporary buildings and storage sheds. Enormous quantities of galvanized wire are used in fences and screens. Brass is an alloy of zinc and what other metal?

Our chief zinc-producing states are Oklahoma, Kansas, New Jersey, Montana, Utah, and Idaho. Zinc is often found near copper and lead. The United States produces about 30 per cent of the world's zinc.

SULPHUR

Sulphur in its various forms is very valuable to mankind. It is an important tissue-building element in many of our foods. Sulphur is also used in making matches, gunpowder, and dyes. Without sulphur there would be no rubber industry as we now know it. Good-year discovered that the addition of sulphur to rubber prevented the rubber from becoming sticky when warm and brittle when cold.

The rubber industry now uses large quantities of sulphur. For a long time we imported most of our sulphur from Italy. Now the United States produces about three fourths of the world's output. Texas and Louisiana are our greatest sulphur-producing states. The mining of sulphur is an interesting process. Superheated steam is forced down through pipes to the sulphur beds. The steam melts the sulphur and compressed air forces the liquid sulphur to the surface where it is dried and is then ready for use.

Various acids containing sulphur are very widely used in refining petroleum and in the manufacture of dyes, dynamite, fertilizers, and wood pulp.

GUIDES TO STUDY

1. What is the difference between a metal and a mineral?
2. What are the chief uses of aluminum in everyday life? What caused the sudden jump in its consumption?
3. What properties of aluminum make it one of our most useful metals? Why is it a first-class metal for the manufacture of planes?
4. What is the chief source of aluminum and how is it extracted from the ore? What are some of the places where aluminum goes through its final processes? Why at these places? Where have new plants been established?
5. Why is magnesium being used in large quantities? What is gained by the use of a light metal? In what ways is magnesium obtained? Where are the plants located?
6. List the uses of tin. Why is it used for each of these purposes? Where are the chief deposits of tin? What are we doing to make up for our failure to obtain tin from the Far East?
7. What are the uses of lead? Of zinc? Of sulphur?

TOPICS FOR CLASS DISCUSSION

1. The world's most important metals.
2. Why copper and aluminum are useful for electrical appliances.
3. Why aluminum and magnesium are valuable for airplane building.
4. Magnesium bombs and the harm they can do.
5. The new plants for producing aluminum and magnesium.
6. How aluminum and magnesium are obtained.
7. The making of tin plate. The uses of tin in industry. Our present sources of tin.
8. How sulphur is lifted to the surface of the earth.
9. A world without sulphur.

WORK TO BE DONE

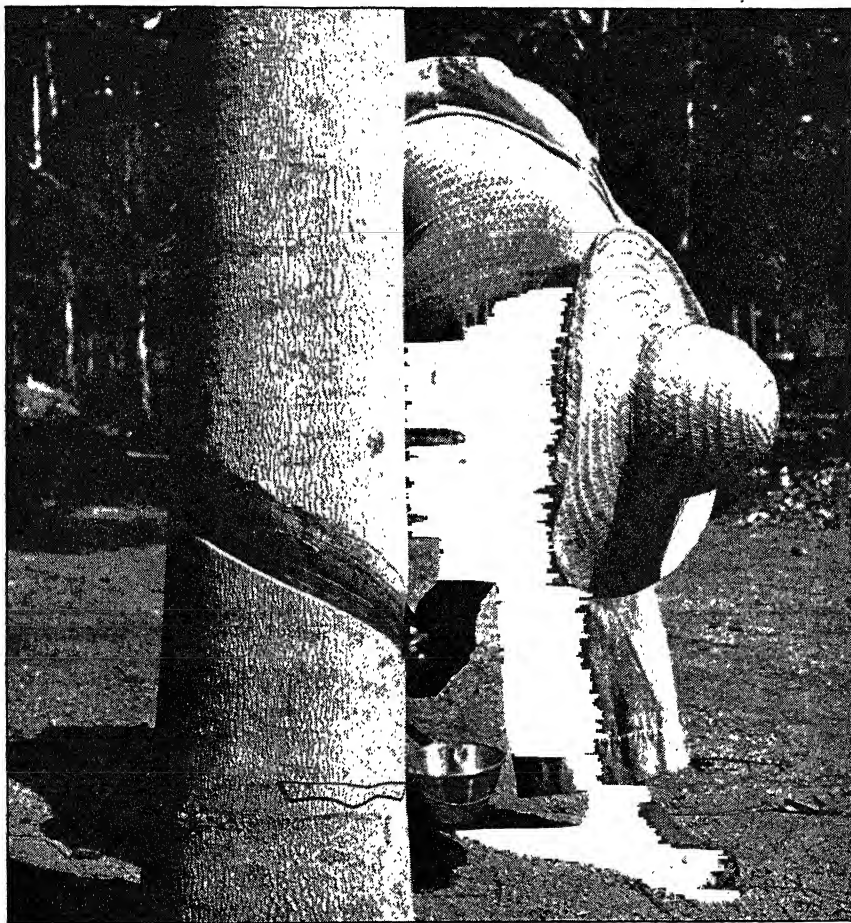
1. Make a list of the articles in your home made in part at least of aluminum or tin or lead or zinc. Why are these metals used in each case?
2. What is an incendiary bomb? How have we been told to deal with them? What is a tracer bullet? What is its use?
3. Make a special study of the sources of sulphur and its many uses.

RUBBER

We learn about rubber. The early Spanish explorers found the natives of Central and South America wearing shoes made of rubber and the children playing with balls made of it. Small quantities were taken back to Europe and experimented with. The first use to which it was put was as an eraser, whence the name *rubber*. In 1823 a Scottish chemist, Charles Macintosh, discovered that rubber could be dissolved in benzine and spread upon cloth to make it waterproof. The raincoat, known as a mackintosh, got its name from this inventor. About the same time another inventor learned that it could be cut into thin strips and woven into an elastic material. The captains of sailing vessels used to carry boots and shoes to ports in the rubber-growing areas to have them coated with this strange waterproof substance. About 1853 a Boston sea captain imported five hundred pairs of rubber boots into this country. From time to time various new uses have been found for this substance.

Goodyear's accidental discovery. By accidentally dropping into a fire a piece of rubber covered with sulphur, Charles Goodyear made a discovery that revolutionized the whole industry. When cooled, the accidentally dropped piece of rubber remained the same at all temperatures. Before this rubber was sticky when warm, and brittle when cold. Goodyear named his new process of treating rubber *vulcanizing*. Vulcanized rubber widely extended the use of rubber and brought great credit to a man who had sacrificed business and family and had been imprisoned for debt because of it. Goodyear has been described as "a man with an India-rubber coat on, India-rubber shoes, an India-rubber cap, and in his pockets an India-rubber purse and not a cent in it." As a result of Goodyear's discovery more than 30,000 different kinds of articles made of rubber have come into general use.

Uses of rubber. In peacetimes about six sevenths of the rubber consumed in this country was used for automobile tires and tubes. In wartime enormous quantities are needed in the manufacture of aircraft, tanks, trucks, jeeps, mounted guns, and ships. The airplanes, tanks, trucks, jeeps, and cars also require tires or their equivalent. One very important use of rubber is in the making of life rafts such as that on which Captain "Eddie" Rickenbacker was saved in the Pacific Ocean. Unbelievable quantities of rubber are used in the construction of ships. Other uses of rubber in the home, the school,

*Photo by James Sawders*

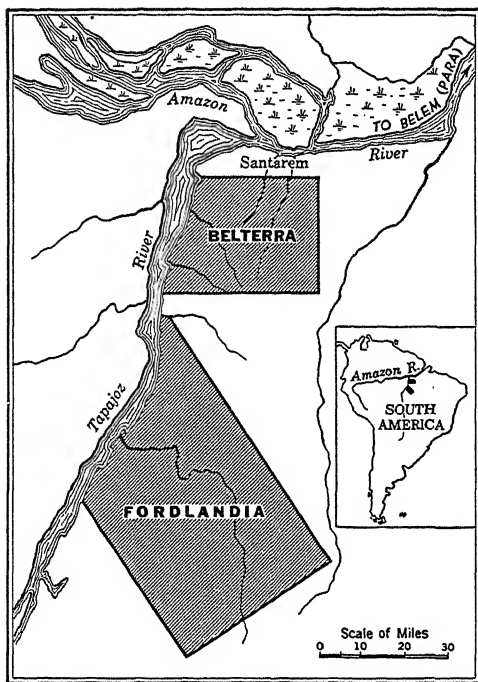
Tapping a rubber tree on the Ford rubber plantation at Belterra, Brazil

the office, and the hospital are too numerous to mention. We just do not know how to get along without rubber.

Where our rubber comes from. Up to 1913 the most of our rubber came from the wild trees of Brazil. From that time till Pearl Harbor the greater part—up to ninety-six per cent—came from the Far East. Since the fall of Malaya and the Netherlands Indies our supply of rubber has been almost entirely cut off.

Anticipating war with Japan, we accumulated a stock pile which, in comparison with our needs, was small. It is still possible to import small quantities of wild rubber from India, Brazil, and Central America, but all this is little more than a drop in the bucket.

To free themselves from the monopoly of the Far East, American



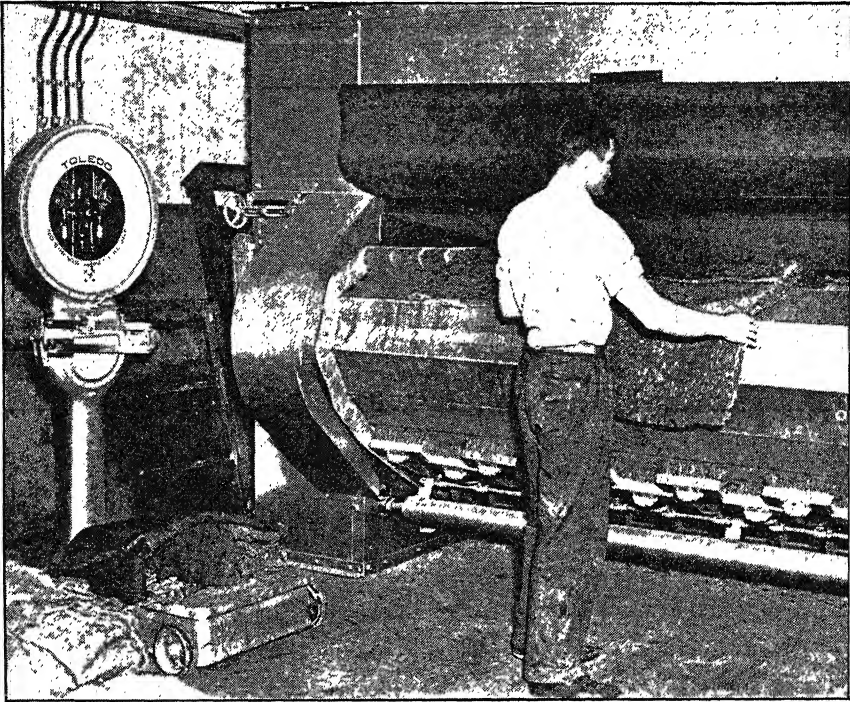
Plan of Ford's rubber plantations in Brazil

manufacturers some years ago established rubber plantations of their own. The Ford Motor Company bought for this purpose more than 3,000,000 acres along the Tapajoz River not far from the Amazon and called the two experimental areas Fordlandia and Belterra. The Firestone Tire Company secured a million acres in Liberia and planted more than 10,000,000 trees. It will be several years before any considerable quantity of rubber is obtained from either of these projects. A Federal Commission is now doing its utmost to increase the production of rubber in Latin America, especially in Brazil.

We need enormous quantities of rubber to meet the needs of war industries, to keep the country as a whole on wheels, and to send to our allies that they may continue to fight with maximum efficiency.

What can we do? After the authorities in Washington had struggled with the problem for some time but with little success, the President appointed a commission to study the problem and report.

As a result of the report of the President's commission various steps have been taken to conserve the rubber we have and to add to our supply. We were told that the country's largest stockpile was in the tires of cars and trucks all over the country. To conserve tires, gasoline was rationed to reduce mileage and thus conserve rubber as well as gasoline. Tires were also rationed to save rubber and to insure a fair distribution. In addition to rationing, scrap rubber, including old tires, was collected to be worked over and used again. Scrap rubber while useful for certain purposes is of little or no value in the war industries. Steps were taken to establish large plants for the production of synthetic rubber. Synthetic rubber is called by various names such as Ameripol, Neoprene, Chemigum, Thiokol, and



Courtesy Goodyear Rubber Company

Chemigum, synthetic rubber, is being dried in this machine and is then made into countless synthetic rubber products.

Buna. They had already been produced in small quantities, but none of them had been perfected or produced at a price low enough to compete with natural rubber. At Institute, West Virginia, in the Kanawha Valley, a superb plant 77 acres in area is turning out rubber at the rate of 90,000 tons a year. That is almost one sixth as much as we used to need in normal times—it is as much rubber as 100,000 Malay natives gather from 18,000,000 rubber trees. Other plants are located at Louisville, Pittsburgh, Baton Rouge, and Los Angeles. Competent authorities estimate that our 1944 production of synthetic rubber will reach or exceed 750,000 tons—which is more rubber by a good one fourth than we used to buy in prewar days from the plantations of the Far East.

Guayule. Before the possibility of obtaining an adequate supply of synthetic rubber was realized plans were made, and to a certain degree put into execution, to plant thousands of acres of a desert shrub called *guayule*. Unfortunately the plant must grow from three to five years before its rubber is available. Moreover, the rubber is in the root of the plant and it is therefore necessary to destroy the



Courtesy Caterpillar Tractor Company

Nursery of guayule seedlings which will furnish small plants for thousands of acres of these shrubs. This is one of the plants from which we hope to obtain rubber to meet the urgent demand while the supply from the Indies is cut off.

plant to obtain the rubber. To obtain a continuous supply of rubber yearly plantings would be necessary.

LEATHER AND ITS USES

The tanning of leather. The conversion of hides and skins into leather is called *tanning*. This word comes from *tannin*, a chemical obtained chiefly from hemlock and oak bark. We still hear of *oak-tanned* leather. After the skins are taken from the tanning vat, oil is worked into them to make them flexible and waterproof.

Oak and hemlock trees were formerly very plentiful in northeastern United States, and for this reason New England early became a leading leather region, Salem, Lynn, and Peabody being important centers of the industry. When the tanbark supply became scarce, the industry spread to other sections; but New England still makes a large amount of leather. Philadelphia now leads all other cities as a tanning center. Chicago and Milwaukee also rank high in leather production. These western cities have the advantage of being close



Photo by James Sawders

Interior of a Massachusetts tannery. These hides are being tanned using a vegetable tanning process. The vegetable products used are oak and hemlock bark, chestnut wood, quebracho wood or the extract from Argentina, and other vegetable substances from Europe and Asia.

to the source of supply of hides and skins, and they also have access to large supplies of tanbark. We import tanning materials of various kinds in large quantities.

The Philadelphia leather industry was greatly benefited by the invention of the chromium method of tanning. A chemical compound of chromium is used instead of tannin, and this chrome leather is better and less expensive than other kinds and is now very widely used.

The importance of hides. The United States makes more leather than any other country in the world. Germany, the United Kingdom, France, the Netherlands, Czechoslovakia, and Canada also have produced a great deal of this product. Originally American tanners could get all the hides that they needed from our own farms and ranches. The industry now demands so much raw material that we are forced to import large quantities of hides and skins. In normal times cattle hides come to us chiefly from Argentina, Canada, and Uruguay; sheep and lamb skins come from New Zealand, Argentina,

and Great Britain; and goat and kid skins from India, China, and Brazil. Many other lands sent us smaller quantities of various kinds of hides and skins. Boston and Philadelphia were our two chief ports for the importation of these raw materials.

Leather in industry. The chief use of leather is for the manufacture of shoes, in which the United States ranks first. Our people are the best-shod in the world. Our first shoemaking centers were in New England, where the shoe industry is still important. Lynn and Brockton, Massachusetts, Binghamton, New York, and St. Louis are world-famous as shoe centers. Besides the abundant supply of raw materials for the production of leather, our leadership in shoe manufacturing has been largely due to the invention of practical and efficient machines for use in this industry. One company in New England supplies most of this type of machinery for factories not only in the United States, but in many foreign countries as well. As a result of this foreign sale of our shoe machinery, many other countries have developed great shoemaking industries, and our world trade in this product has suffered. Czechoslovakia, for example, was able to sell shoes even in America in competition with our own products. We sent large shipments of footwear to England, Panama, Cuba, and Canada. Besides its use in the manufacture of footwear, leather is widely used in the making belting, gloves, harnesses, saddlery, bags, cases, and various novelties.

The increasing demand for leather in manufacturing is leading to a shortage of hides and skins. As a result, many substitutes for leather are already being used. Wood, paper, and cloth are treated chemically and used instead of leather for many purposes. Chemical research thus attempts to find new synthetic products to take the place of many natural raw materials. The increased demand for shoes for our armed forces has made it necessary to ration shoes.

GUIDES TO STUDY

1. When was rubber first known and what uses were made of it?
2. What discovery was made by Charles Goodyear? Of what importance was it?
3. Where did our rubber come from before Pearl Harbor?
4. What have American companies done to free themselves from Far Eastern monopoly?
5. What efforts are being made to do without natural rubber?
6. What efforts are made to conserve rubber?
7. How can we make our present tires last as long as possible?
8. What articles made of rubber are no longer found in our stores?

9. Of what is synthetic rubber made?
10. What steps have been taken to increase our supply of natural rubber?
11. How is rubber obtained from the guayule shrub?
12. How is leather tanned? Why is it tanned?
13. What substances are used for tanning leather? What are our leading tanning centers?
14. Why does the United States lead in the tanning of leather?
15. What are the sources of our tanning materials? From what countries do we import hides and skins?
16. What are the chief uses of leather?
17. Why does the United States lead in the manufacture of shoes?
18. Is it wise for us to export shoe machinery and then lose the sale of shoes in foreign countries?
19. What substitutes are used for leather? Why?

TOPICS FOR CLASS DISCUSSION

1. Gathering and curing rubber in Brazil.
2. Gathering and curing rubber in the Far East.
3. Rubber plantations in the Far East, in Africa, and in Brazil.
4. Wartime uses of rubber as compared with peacetime uses.
5. Synthetic rubber—how it is made and its value as compared with natural rubber.
6. Competition with natural rubber in the future.
7. Rubber is a great shock absorber. Tons of it are used in a single battleship. Why?
8. The different hides and skins used in making leather.
9. The different materials used in tanning leather.
10. Tanning with chemicals.
11. Shoe machinery and shoe factories.
12. Foreign trade in leather and shoes.

WORK TO BE DONE

1. The story of rubber is one of the most interesting in the world. Choose members of the class to make a thorough study of the history of rubber including its discovery, how the tree grows in its native country, how it came to be transplanted to the Far East, the loss of the industry to the native country, and finally the loss of the great producing regions as a result of the global war.
2. Appoint members or committees to study and report to class facts relating to synthetic rubber.
3. Make a list of articles you know to be made wholly or in part of leather.
4. Compare the methods of making shoes in colonial days with the methods used today. List the different substances used in the making of the shoes you are wearing.
5. In the manufacture of shoes what means have been taken to conserve leather?



Courtesy Caterpillar Tractor Company

Some 6,000,000 feet of pine logs in huge piles ready to be transported by train to the mill. Just now the demand for lumber is very great. Why?

OUR FORESTS—ONE OF OUR GREATEST RESOURCES

Extent of our forests. Nature has been kind to us in giving the United States extensive areas of forest lands. These are fairly well distributed over the country. All our Northern States from Maine to Minnesota were once well covered with evergreen trees and some hardwoods. The Southern States from Virginia on the northeast to Texas on the southwest still possess great areas of valuable forest lands. Our greatest reserves, however, are in the Pacific Northwest, particularly in Washington and Oregon.

Forests of northern United States. This was originally one of the richest forest areas of the country. The stands of timber were mainly of pine, spruce, and hemlock. These softwoods are preferable to hardwoods for most building purposes. As a rule they have

straight grain, do not crack or warp, and, because of their softness, are easily worked.

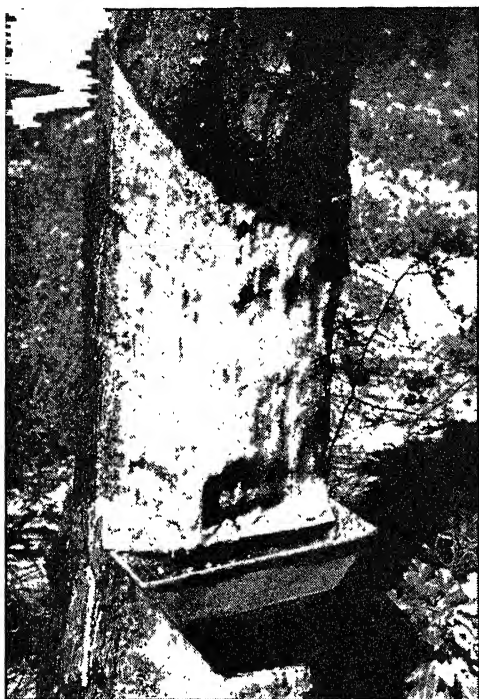
The early settlers in these regions needed land for gardens, fields, and pastures. The trees were cut and the logs rolled into piles and burned. Groups of neighbors helped one another clear their land. A gathering of farmers to roll the heavy logs into piles was a *log-rolling*. Now, when our Congressmen help one another put bills through the Congress, they are said to be logrolling.

This northern forest area has come to be the most densely settled part of the country. As the population increased, vast quantities of lumber were needed for homes, stores, ships, railroads, paper, and other purposes. The trees were cut with little regard for future needs. For these reasons only a small fraction of the original forest lands now produce lumber or even paper pulp. Now every industry of the region depends upon the South or the Northwest for the greater part of the lumber used.

Consumers of lumber in the Northern States must pay the cost of transporting it from the South or from the Northwest by way of the Panama Canal or overland across the Rocky Mountains. Transportation adds to the cost of lumber, makes the cost of homes greater, and increases the rent which the owner of property must receive. Everyone who owns a home or who pays rent must help pay the cost of transporting lumber from a distance. Everyone then should be interested in making the forest lands of his part of the country yield the greatest return possible.

Hardwood forests. Trees yielding hardwoods are found throughout all the eastern forest areas. Lying between the northern regions and those of the South is a belt consisting mainly of hardwood trees, such as oak, ash, maple, and gum. The hardwoods are well adapted for finishing the interior of houses and for making furniture.

Forests of the South. Until very recently the Southeastern States yielded the largest annual cut of all our forest areas. The softwoods are quite different from the woods of the northern areas. Much lumber has been shipped from these states to our Northern States and to many foreign countries. This area, if properly cared for, will probably supply much of our lumber for the future. Pines of the Southland grow more rapidly than trees do in any other part of the country. The mild climate and abundant rainfall make for a very rapid growth. It is to this section that our paper industry seems to be rapidly moving. In recent years thousands of acres have been reforested thus providing for future needs.



Photo, by James Sawders

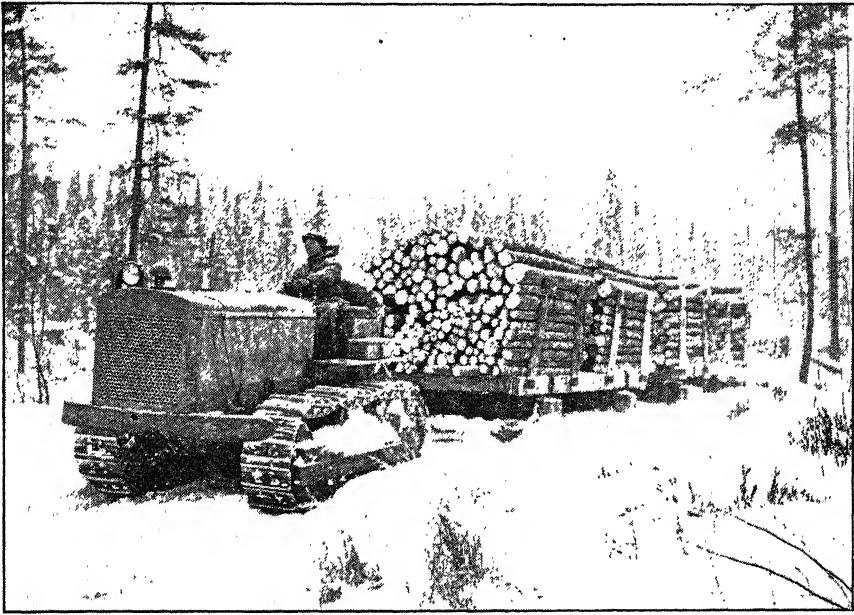
A close-up showing a turpentine cup on a pine tree in South Carolina. Note the dripping sap. Naval stores have gone to war. Find out their war uses.

Naval stores. Naval stores, such as tar, turpentine, and rosin, are products of the southern forests. These products are so named because in the days of wooden ships they were used by shipbuilders and on board the ships. A sailor was often referred to as a *tar*. These products now find other uses. Turpentine is used in making paints and varnishes. Rosin is used in making varnishes, soaps, and linoleums and in sizing paper.

Originally to obtain the gum—the source of rosin and turpentine—the bark was removed from one side of a pine tree near the base. The fluid collected in a pocket cut in the tree below

a series of gashes. This method was very injurious and soon killed the trees. In recent years a metal cup has taken the place of the pocket. By this method less injury is done to the tree. By distillation rosin and turpentine are obtained from the raw gum. The United States produces more than half the world's naval stores, and before the war more than half of its production was sold abroad, especially to England, Germany, and the Netherlands. A large number of workers were employed in this industry.

Making trees into lumber. Methods of lumbering differ in different parts of the country. In Canada and northern United States the winter season offers the best conditions for lumbering. Then the ground is frozen and even swampy land supports men, horses, and tractors. The rough ground is usually covered with snow over which smooth roads can be built from the logging camps to a stream down which the logs are to be floated. During the cold weather men and animals are not troubled by mosquitoes and other insects which in summer make life almost unbearable.

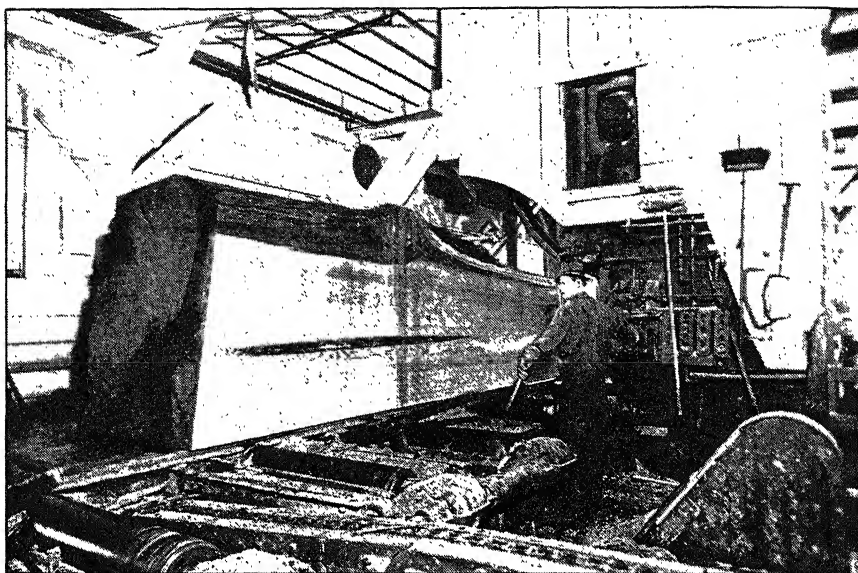


Courtesy Caterpillar Tractor Company

Loads of pulpwood drawn on sleds from camp to river. When the ice melts in the spring, the logs are floated downstream to the mills at Rainy Lake, Ontario.

The lumbermen live in rude camps during the logging season. The hard work requires both strength and endurance. After the trees have been selected and marked for cutting, a V-shaped notch is cut in one side of the tree near the ground. The tree is expected to fall on the side toward the notch. The rest of the cutting is then done by a large crosscut saw which is used on the side opposite the notch. After the tree falls, the branches are removed and the tree cut into logs. The logs are then drawn over the snow or ice to the riverbank.

With the coming of spring and the melting of the ice on the river the logs are floated in great numbers down to the sawmills. Here they are yarded in enclosures made by fastening the ends of floating logs together. An endless chain draws them one by one into the mill. Here the log is placed on a carriage which moves back and forth carrying it against a rapidly moving saw. For the lighter work circular saws are used. For slicing the large logs into planks or boards band saws are used. These are endless belts of steel with sharp teeth which pass over wheels one above and one beneath the log. Sometimes several band saws near together, known as a *gang saw*, cut several planks from the log at one time. Circular saws then



Courtesy Caterpillar Tractor Company

Sawing a big log into boards and planks in a sawmill in California. Machinery moves the log back and forth against the saw in much the same way that ham is sliced in a meat market.

remove the bark from the edges of planks or boards and make the edges even. The surface of the lumber may be made smooth by planing before it leaves the mill, or the planing may be done after it reaches the lumberyard where it is to be sold.

In the forests of Washington and Oregon lumbering is carried on in quite a different way. There the country is often mountainous and the streams swift with falls and rapids. The trees are larger and taller than in any other part of the country. Logs cut from these trees are very heavy. To aid in moving them over the rough ground use is made of tall trees which are equipped as *spar trees*. After selecting the proper tree a man known as a *high-climber*, or *high-rigger*, who uses a belt which encircles himself and the tree, climbs to a point near the top just below the lowest branches. With a saw he cuts off the top of the tree. As the upper part falls, the part of the trunk to which the man is attached swings violently back and forth. The worker is in danger of being crushed against the tree or of being thrown to the ground. First heavy wire cables are run from the top of the spar to the ground to serve as supports. Near the top of the spar a heavy pulley is attached through which passes a strong wire cable. Near the trunk one end of the cable is wound around a cylinder turned by an engine or motor. The other

end of the cable may be attached to logs as much as one thousand feet distant. The logs are drawn to the base of the tree and there loaded on cars or trucks. Two spar trees may be connected by a cable known as a *high-line* along which a trolley runs back and forth. By means of pulleys the logs are drawn over rough ground or through the air over ravines to the yard or railway. Some of the logs are so large that one is all that a flatcar can carry.

Forest areas of the West. There are two forest areas in western United States. One is in the Rocky Mountain region and the other in the Pacific Northwest. The pines, spruces, and firs of the Rocky Mountains are in a thinly settled region and are not easily accessible to the great lumber markets. Therefore, only a very small portion of this area has been cut over.

The greatest forest reserves of the whole country are in western Washington and Oregon. Here are pine trees, spruce, hemlock, and Douglas firs. These great forest areas have been reserved mainly because of their distance from lumber markets. Now that other areas are becoming depleted, the country is drawing heavily on the resources of the Northwest. For some years the annual cut has exceeded even that of the South. Lumber from the Northwest is shipped to the eastern coast of the United States and to the countries of South America bordering the Pacific. Before the war it was shipped to China, Japan, and Australia. Farther south in California is the home of the giant sequoias, commonly known as the *big trees*, many of them thousands of years old. They are unfit for lumber.

Imports and exports of lumber. Although our forests are being destroyed more than four times as fast as they are replaced by growth, yet just before World War II we exported lumber and other forest products to the value of nearly \$100,000,000. Great Britain took nearly a third of the exported products of our sawmills. Japan is a convenient market for the lumber of Washington and Oregon and that country was one of our best customers. Articles made of wood were sent in large quantities to Great Britain, Canada, and Cuba as well as to other countries.

Our imported lumber comes mainly from Canada. From that country we import quantities of spruce, hemlock, and pine for building purposes. That country in normal times also sends us each year more than 3,500,000 Christmas trees, besides great quantities of pulpwood, wood pulp, and newsprint. We used to receive mahogany from Central America, the west coast of Africa, Mexico, and Brazil.

PAPER—A MARK OF CIVILIZATION

A product of multiple uses. Paper has become so much a part of our modern life that it is difficult to imagine how man ever existed without it. In our homes, in our offices, and in all our trades and professions it plays an inconspicuous but important part. Varying in texture from the most delicate tissue to the sturdy wallboard or paper shingle, it serves us in our homes as twine or in the form of bags and wrapping paper; it serves the merchant as a protection in the handling of foodstuffs and merchandise in general. The artist paints and etches on it, the author's works are printed on it, and the doctor and the lawyer keep their records on it. So large a part does paper play in our intellectual lives that we have come to use the word *paper* when we usually have in mind that which is written or printed on it. We read the daily *paper*. We write an examination *paper*. The scholar reads his *paper* before an audience of learned men. Much of the wisdom and lore of the ages is now recorded on paper and stored in our libraries and museums for the use of countless future generations.

Tablets of stone. Primitive man, when he conceived the idea of recording his personal ideas or the exploits of his tribe, engraved them upon stone or inscribed them on bricks of clay. We can still find many old sketches or inscriptions on the walls and ceilings of caves, on temple walls, or in collections of tablets that correspond to our modern libraries. Later skins of animals were used as a vehicle for such recordings. The American Indian used the skin of the deer, Asiatics and Europeans used the skin of the sheep, known as *parchment*. Even today, when college diplomas are inscribed on paper, they are often referred to as *sheepskins*. Biblical and other early Scriptures were written by hand on parchment. The sheets of parchment were fastened together to form long rolls. These rolls could be easily stored and transported; therefore they were a great improvement over the tablets of stone. Our own time is truly an age of paper. Its wide use and the very important function that it serves in our modern life attest to that. Not only does it serve in its own field, but, as a conservator of other materials, it plays a very important part.

The story of paper. Thousands of years ago the Egyptians made paper from the pith of the papyrus plant as a substitute for parchment. Thin slices of the pith of the plant were laid crosswise and lengthwise, moistened, pressed into thin sheets, and then dried. These sheets like the plant from which they were made were called

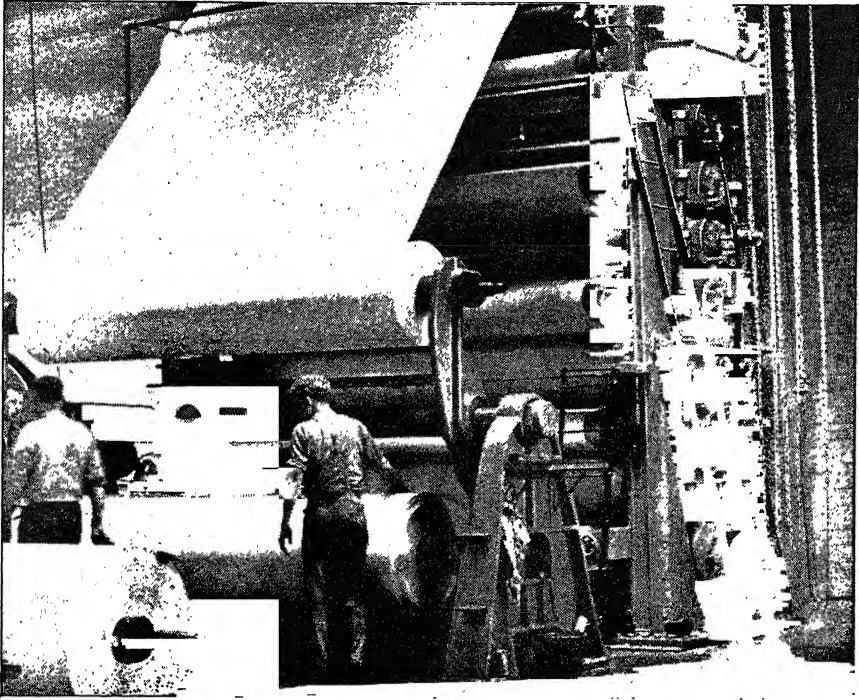


Photo by James Saunders

An extra-finish "gloss" is applied to paper by a special process as it passes through a stack of steel and fiber rolls alternately arranged.

papyrus—whence comes our word *paper*. The Chinese and Japanese too have for ages made paper from rice straw. The art of making linen paper from rags was introduced into Europe when the Moors invaded that continent.

Papermaking in the United States. *In the Northeastern States.* Although the first paper mills in this country were established near Philadelphia, New England was for a long time the chief center of the industry. In early years paper was made exclusively from rags. The waste from the many textile mills added to contents of the domestic rag bags supplied all the material that the trade demanded. As education became more widespread and increasing numbers of people learned to read and write, the demand for cheap paper became so great that there were not enough rags to meet the demand. When the discovery was made that wood could be used as a substitute for rags, the whole industry was revolutionized. The mills were then moved to the large streams near the softwood forests of the Northeast where at first there appeared to be an unlimited supply

of raw material. So rapid has been the devastation of these forests that manufacturers have become alarmed lest the supply become exhausted.

In Washington and Oregon. Papermaking has come to be an important industry in western Washington and Oregon. This region is favored by its great supplies of raw material and by an abundant supply of water. Papermaking calls for much power to run the great machines which grind the logs and mix the pulp and to turn the enormous rollers at an unbelievable speed. Vast quantities of water are used in the mill itself for mixing the pulp and keeping it in a fluid condition until it is finally dried upon the rollers. No other part of the country offers better facilities for papermaking than the forest regions of Oregon and Washington.

In the Southern States. Industrial chemists have devoted their efforts to the use of the pines in the Southern States in the manufacture of paper pulp. Processes have been discovered whereby a quite satisfactory paper is now made from this new source of supply. Now paper-mill owners and other capitalists have become interested in this section of the country. In the South trees grow more rapidly than in the North and for this reason it is possible that the southern forest areas may supply a large part of our future demands for wood pulp. The late Dr. Charles Herty, whose chemical research made possible the use of the southern pines for paper, believed the forests of the South could meet the world's demand for pulp if replanting were properly done. Three of the largest replantings of forest trees of 1937 were made in Louisiana, Mississippi, and Texas. These three plantings alone totaled nearly 60,000 acres. Some of the largest paper mills in the world have been constructed in the Southern States.

Today's paper. The finest grades of writing paper are still made of linen rags. Paper made of cotton rags and other materials is sometimes given what is called a linen finish to enhance its desirability. The bulk of our paper supply, however, nine tenths of it in fact, is made of wood pulp. Not all kinds of trees yield a pulp that can be used in the manufacture of paper. Spruce wood, with its simple fibers which are practically all of the same nature, makes the best pulp. Fir, hemlock, and poplar can be used and very recently southern pine has been found to yield a satisfactory pulp. Paper made from rags is much more durable than that made from wood pulp. Newsprint made from wood pulp becomes brittle and yellow with age. Some of our largest newspapers, such as *The New York Times*, run off a small number of copies of each edition on rag paper which

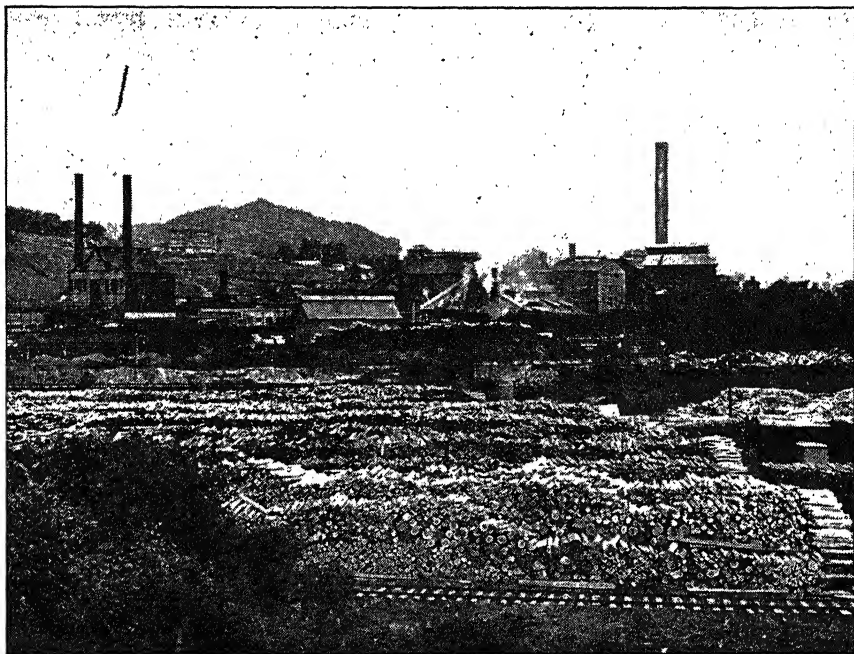


Photo by James Savaders

A North Carolina factory where fiber board or wall board is made. What does the picture tell of the raw material used?

will stand the test of time when placed in the larger libraries. They will thus be found in good condition by future generations. Coarse and heavy grades of paper are made of straw, sugar-cane waste, jute, old burlap, and old Manila rope.

The process of papermaking. The logs are cut into two-foot lengths, and the bark is removed by revolving knives. The wood is then ground into pulp. A better grade of paper is obtained by what is known as the *sulphite* process. By this method the fibers separate more easily and are therefore longer, thus producing a stronger and finer grade of paper. The process from pulp to paper is carried on by a single machine. As the paper issues from the rollers, a thousand feet a minute, it is wound on huge spools or rolls varying from five to eighteen feet in width. The best grades of writing paper and ledger paper are sized with a solution of gelatin after being run off the machine. The sizing is very necessary if paper is to have an ink-resisting surface.

Who uses most of the paper? No other part of the world consumes so much paper as our Northern, Eastern, and Central States. A single Sunday edition of one of our great city newspapers uses

the pulpwood from more than two hundred acres of forest land. Added to this is the demand for paper stock for innumerable daily papers all over the country with their many extras, weekly and monthly magazines, and millions of books. Wrapping paper, paper bags, wallpaper, building paper, paper shingles, dishes, etc., enough to meet the needs of our enormous population, call for an amount of paper pulp that is almost beyond reckoning. Before the war, to meet this ever-increasing demand for paper, large quantities of wood pulp were imported from Canada and smaller quantities from Sweden, Finland, Norway, and Russia. Owing to the greater demands made for paper by war activities, the Federal Government has found it necessary to restrict consumption of paper by newspaper, magazine, and book publishers.

What becomes of wastepaper? Most kinds of paper are very cheap; yet it pays to collect wastepaper and manufacture it into articles of cheaper grade, such as cardboard and material for packing cases. Only a few years ago chemists discovered a way of removing the ink from old newspapers and magazines. Now this waste can be made into clean white paper similar to that made from the original wood pulp.

Thousands of tons of old newspapers were formerly exported to foreign countries. In some European countries where paper is expensive, old papers were used for wrapping paper in the stores. Now, even in England, wrapping paper is considered a nonessential. One provides his own container or carries his purchase unwrapped. In southern China our old papers were used in the manufacture of firecrackers. In the northern part of the country where the climate is colder, they are used to cover the walls of rooms to keep out the cold. In Java to which we sent great quantities of old newspapers, the storekeepers cut the papers into exact sizes and paste the parts together to make paper bags.

GUIDES TO STUDY

1. Where are the forest areas of the United States?
2. How does the present forested area of the United States compare with the area which was forested when the country was discovered? What has happened to the forests? Why?
3. The early settlers found the forests in some ways to be a good deal of a nuisance. Why?
4. What was a "log-rolling"?
5. How does the lack of forests in the region in which a person lives add to his cost of living?

6. What is meant by hardwoods? Softwoods? Name as many trees as you can in each group.
7. Why are the forests of our Southern States one of the country's valuable resources?
8. Describe the methods of lumbering used in different parts of the country.
9. How does the Federal Government try to conserve our forests?
10. How may the airplane aid in forest conservation?
11. Why do our greatest forest reserves happen to be in the Northwest?
12. How may deforestation be a danger to agriculture? Can you give any illustrations?
13. What are National Forests? What is the Government's purpose in holding these areas?
14. What forest products are exported and what imported? Why?
15. Why is paper one of our real necessities?
16. How did ancient people get along without paper?
17. How did the Egyptians make paper?
18. Where were the first paper mills in the United States? Why?
19. Why is the making of paper an important industry in Washington and Oregon?
20. What does the South have to offer for the paper manufacturer of the future?
21. Where is paper used in largest quantities? Why?
22. Explain the statement "Advertising is ruining our forests."
23. Paper made from rags is more durable than that made of wood. Why do some newspaper publishers furnish libraries copies of newspapers printed on paper made from rags?

TOPICS FOR CLASS DISCUSSION

1. The value of forests to a country.
2. How our forests have been destroyed.
3. The need of conserving forests. How we can help.
4. The life of the lumberman.
5. The work of the sawmill.
6. A country without paper.
7. The processes of paper making.
8. The locations of the great paper mills.
9. Where the most paper is used.
10. The best paper.
11. Uses of paper.
12. Why paper is rationed.
13. Waste paper. Why save it?

WORK TO BE DONE

1. On an outline map of the United States indicate by different kinds of shading the forest areas of the United States. Number the regions and list the kinds of trees growing in each region. Which of these regions has the greatest reserves?

2. Prepare special reports on methods of lumbering in different parts of the country.
3. Prepare an exhibit consisting of different kinds of wood, maps of forest areas, pictures of lumbering, and booklets prepared by members of the class.
4. Prepare and present to the class reports on the making of paper in past centuries and at the present time.
5. Make a special study of the history of paper manufacturing in the United States.
6. Collect samples of different paper products. Tell of what each is made and tell the uses of each.

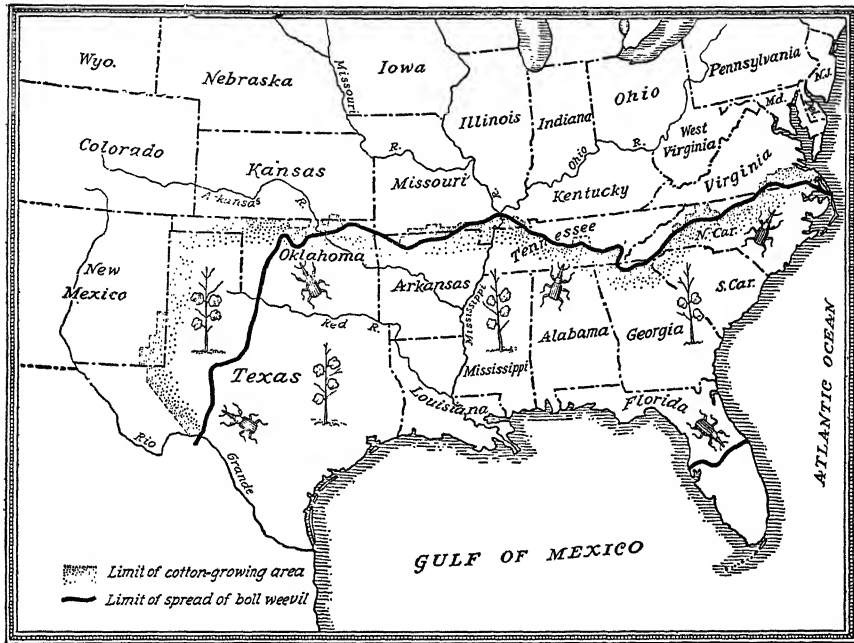
6. THE TEXTILE INDUSTRY MEETS MANY WARTIME NEEDS

COTTON

Cotton goes to war. Cotton is an essential war material. At least 5000 articles in which cotton is used are needed by our armed forces. For instance it is used in making safety rafts which frequently save the lives of aviators and sailors. It enters into the construction of parachutes by means of which food and equipment as well as men are dropped from planes to places otherwise inaccessible. Barrack bags are ordered by the army in lots up to 9,000,000; neckties up to nine or ten million; undershirts up to 18,000,000; and over 75,000,000 pairs of socks. Such orders keep all our mills busy, even those in New England where in times of peace the cotton textile industry had greatly declined.

Strong duck is needed for tents and for the covers of trucks. Uniforms for summer wear are needed in million lots. The woolen industry is stimulated in much the same way, but not to the same degree because there are not so many uses to which woolen goods can be put. Cotton is a commodity of which the United States produces an abundance. For many years cotton was our leading export.

Where our cotton grows. The region known as the *Cotton Belt* extends from North Carolina southward and westward to Mexico. In this vast area cotton is the leading crop because both soil and climate are nearly ideal for its growth. More than fifty per cent of the cultivated land in this region is devoted to cotton. Corn acreage is second to cotton, and fruits and vegetables are raised in large quantities. The Cotton Belt is limited on the north by a growing season too short for cotton; on the east by sandy soil and heavy rainfall; on the south by swampy lands and too much rain at harvesttime; and on the west by lack of sufficient rain. In sections where cotton



has been planted on the same land year after year, commercial fertilizer is used to insure a good crop. More fertilizer is used in the Cotton Belt than in any other section of the country.

A more recent development in cotton growing was the production of long-staple cotton in Arizona and Southern California. This type of cotton originated in Egypt. Seeds are imported and by selective breeding an American variety has been developed which is considered superior to any other. Long-staple cotton is used in the manufacture of automobile tires, airplane wings, sewing thread, and wherever great strength is needed. Before the war more than 1,000,000 bales of cotton were used annually in the manufacture of tires.

Cotton culture. Cotton seeds are planted in March and April and the growing plants are given frequent cultivation. The plants blossom in early summer and in August and September the bolls begin to ripen and break open. The ripe bolls are carefully picked by hand since blossoms and green bolls may be on the plant at the same time that picking begins. A mechanical picker has recently been invented which is said to be quite successful. The chief difficulty is to pick the fibers from the ripened bolls without injuring the blossoms and green bolls and without mixing too much trash with the fiber.

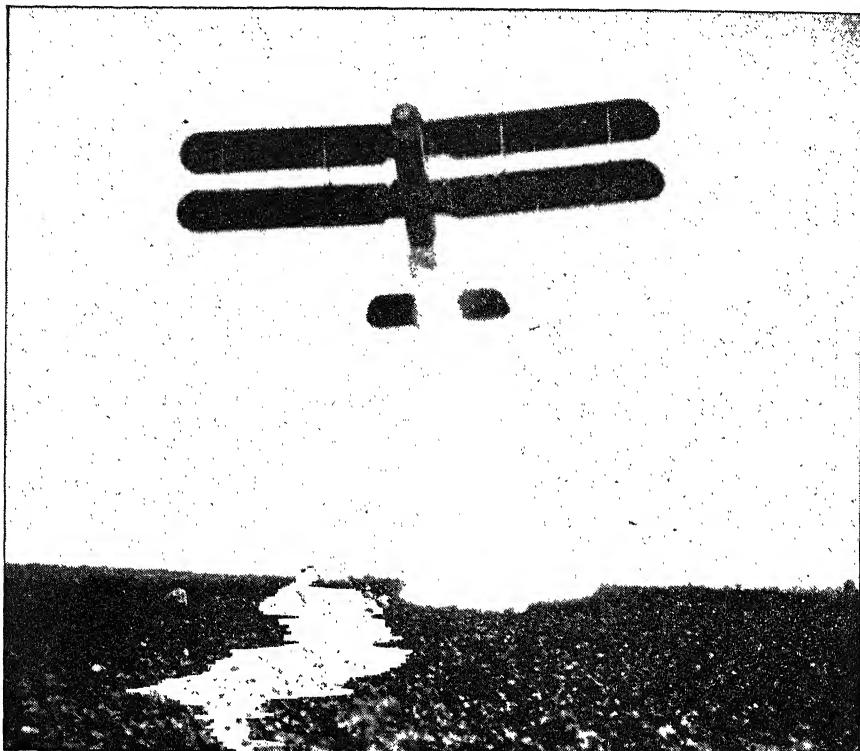


Photo from Keystone View Co.

Plane dusting a cotton field with a poisonous powder to destroy the boll weevil. The fields are sprayed at the rate of 1000 acres an hour.

The boll weevil. Like other crops cotton suffers from insect pests. The worst of these is the *boll weevil*. This beetle punctures the squares or bolls to deposit eggs that produce the larvae which destroy the buds or bolls. The boll weevil is hard to kill because it is hidden inside the boll. Spraying with calcium arsenate destroys the adult insects, which feed on the foliage and are killed by the poison which the spray deposits on the leaves. The only other ways to combat these pests are by hand picking and by burning infested plants.

The boll weevil gets a monument. In some ways the boll weevil has proved a blessing to the cotton grower. It has compelled him to turn to other crops not injured by the weevil. Some plantation owners have learned that by raising peanuts, corn, and other crops that can be fed to hogs and cattle greater profits can be made than by raising cotton; that is, the Southern farmer is gradually turning from a single crop to a variety of crops. Single-crop farming



Courtesy Celanese Corporation of America

Cotton linters are the fine hairs which remain on cottonseeds after the fibers have been removed. Here the linters in bales are being fed into a hopper for transportation to a chemical building where they will be used in making cellulose.

makes the farmer dependent upon others for meat, dairy products, and vegetables. By producing these foods for himself, he does not have to pay for their transportation from other places. Moreover, if the cotton crop fails or if the price is very low, he still has food and other sources of income. The people of one county in the South have erected a monument to show their appreciation of the prosperity which the boll weevil has brought them.

Overproduction. In recent years, after the beginning of the depression of 1929, the cotton grower found it impossible to secure a market for all his cotton. An oversupply, or surplus, also causes a fall in price; thus the planter suffers in two ways. To overcome this difficulty the Federal Government tried in various ways to induce the cotton grower to plant less cotton. The greater demand for cotton due to the war has solved the problem of overproduction for the time being.

Cotton ginning. Before the cotton is put through the gin, it must be dried in order to prevent the fibers from being cut by the machine. In the gin the fibers are quickly separated from the seeds and are then pressed into bales, each weighing about 478 pounds. These bales are covered with burlap and bound with iron bands.

The bales are then shipped to American mills and to foreign markets. Bales for the export trade are further compressed under great pressure and are thus reduced in size so as to take up less space in the holds of ships.

The gin leaves a downy coating on each seed. This fine material, when removed by special machinery, is called *linters*. Linters are used in the manufacture of smokeless powder, cotton batting, rayon, and many other articles.

Cottonseed products. Cottonseeds were formerly thrown away as useless, and the large accumulations of this waste material often became nuisances. But many uses have now been found for cottonseed, and its by-products are worth more than \$200,000,000 annually.

Cottonseed is first pressed and the oil obtained is refined and used in making substitutes for lard, butter, and olive oil. It is also used in making salad dressing and soap. After the oil has been extracted, the rest of the cottonseed is ground into meal which is used as a fertilizer and as cattle feed. Cottonseed cake and meal in normal times are exported for cattle feed.

Cotton mills in the United States. Our two leading cotton-manufacturing regions are New England and the southern Piedmont. The industry developed first in New England because of the excellent water power and the skill of the early settlers in spinning and weaving. At first most of the cloth was made in the homes, but when machines came into use many mills were built at various points along the rivers. Such textile centers as Lowell, Lawrence, Manchester, Woonsocket, Pawtucket, New Bedford, Fall River, Lewiston, and Providence owed their importance to good water power and to favorable locations near the coast.

For many years the South has made rapid progress in cotton manufacturing. North Carolina, South Carolina, Georgia, Alabama, and Texas have great cotton mills which are well supplied with water power and are close to the sources of raw cotton. These Southern States also pay less for their labor than the Northern mills. As a result the South is now manufacturing several times as much cotton as New England.

Some of the largest textile mills of New England have been forced to go out of business because they were unable to compete with the South and with foreign countries with cheaper labor. Much of the abandoned floor space of the huge New England mills has been taken up by a variety of new and smaller industries. Some of the mills now manufacture rayon in place of cotton. Since the

beginning of the war, however, all mills both North and South have been rushed with orders.

Cotton in commerce. Before the war the United States produced about two fifths of the world's raw cotton and sent one half of its production to foreign countries. Japan took about one fourth of our raw-cotton exports in recent years and Great Britain was our next largest customer. India and Egypt were also great cotton exporters, sending most of their product to Europe. Brazil is rapidly increasing its cotton production.

The cotton goods made in the United States and in most of the European countries are sold in the countries where they are produced. Great Britain, however, sends its cotton goods all over the world. Here in the United States we use many fine English cotton fabrics, such as gingham, lawn, muslin, dimity, and broadcloth. Both Japan and India used to export cotton goods. Japan was once the greatest importer of raw cotton and was second only to Great Britain in cotton-goods exports. Japanese goods competed with British and American cotton products even in Europe and the United States. This competition of course reduced both British and American trade.

WOOL

The uses of wool. The chief quality of woolen cloth is its warmth. For that reason woolen clothing is preferable to cotton in cold seasons and cold countries. Wool is woven in many different ways and makes both beautiful and durable fabrics. Besides its use for clothing, wool is used for shawls, scarfs, bedding, rugs, and carpets. It is the most ancient textile known.

The early woolen industry. In the early days of our country practically every farmer kept some sheep and used the wool to make homespun cloth. This continued until the introduction of cotton-manufacturing machinery led to the use of similar machines in making woolen cloth. Gradually woolen mills took the place of the home industry, and the old spinning wheels and hand looms were discarded. These old implements are very rare today and are eagerly sought by collectors of antiques.

The first woolen mills were in New England and that section still leads in woolen manufacturing in the United States. Philadelphia and other cities of Pennsylvania have become important centers for the manufacture of carpets and rugs. At first New England supplied its own raw wool, but as the demand increased great quanti-

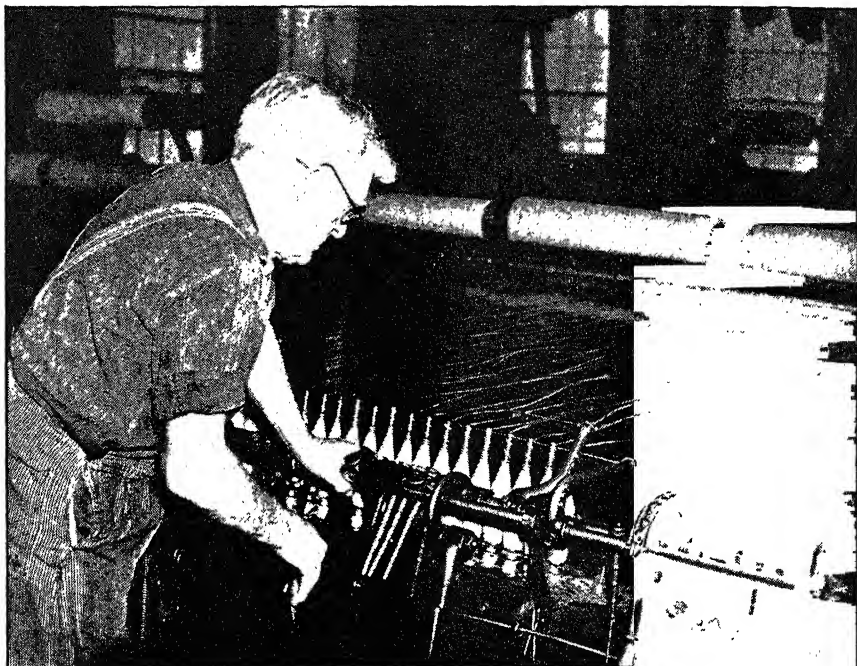


Photo by James Sawders

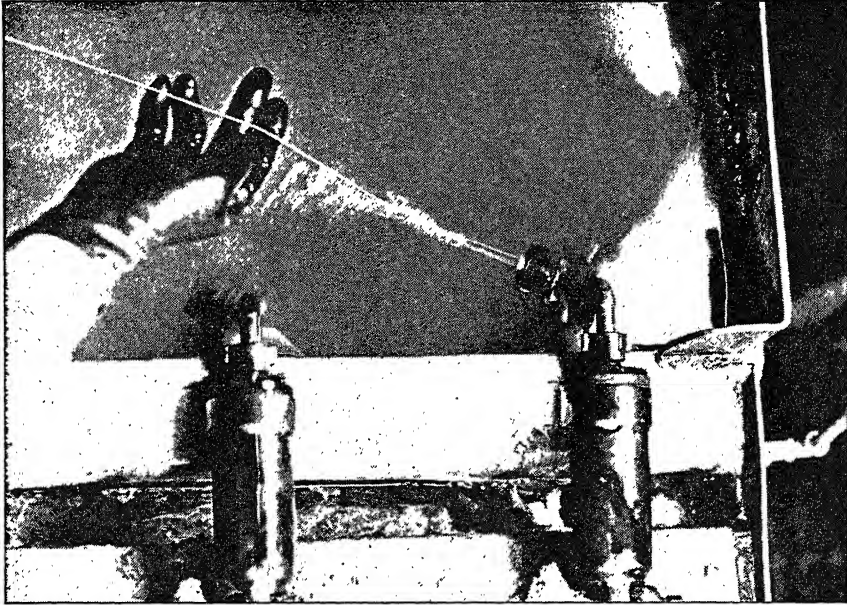
Spinning woolen yarn on modern electrically powered machines in a New England manufacturing plant

ties were shipped in by rail from the West where sheep raising has become a great industry. In normal times our mills require so much wool that about one third of the supply has to be imported, mostly from Australia, Argentina, and South Africa.

SILK

An Oriental textile. Silk culture began in China and was kept a secret for centuries. After the Japanese learned the secret, they became the world's greatest silk producers. They not only used scientific methods, but they have an unlimited supply of cheap labor. Italy, France, Spain, and other Mediterranean countries produced some raw silk, but Japan produced four fifths of the world's total, with China second, but far behind.

Since Pearl Harbor all supplies of silk from the Far East have been cut off. The war cut off the relatively small quantity of silk which we formerly imported from Italy. Consequently the manufacture and use of articles made of silk have practically ceased. Silk has one use for which there is no satisfactory substitute—the

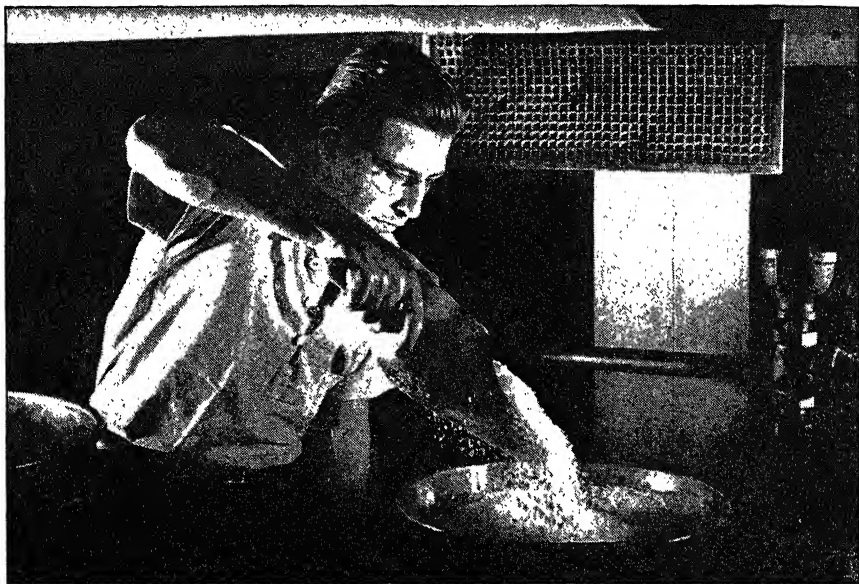


Courtesy E. I. du Pont de Nemours and Company

Here liquid viscose or cellulose is being changed as it passes through a chemical bath into rayon thread. The liquid leaves the spinneret through many fine holes as fine rayon filaments but in a short space these unite to form a rayon thread.

making of powder bags needed in charging large guns. Silk does not produce sparks nor does it char as do most of its substitutes. When the explosion takes place every trace of silk disappears. That is why women are urged to save their old silk stockings and turn them in to the Government.

Rayon. The rapid increase in the use of rayon is due mainly to the constant improvement in quality. Even an expert cannot distinguish some rayon fabrics from real silk. Aside from appearance many rayon fabrics possess qualities which make them superior to silk. For example, unlike a silk fabric, rayon can be successfully laundered again and again. It lends itself to the production of a greater variety of textures, ranging from the sheen of silk to the soft dull texture of wool. Rayon also takes dyes more readily, gives more beautiful shades, and holds colors better than silk. The objectionable gloss common to earlier rayon has been overcome by improved methods of manufacture. Because of its many excellent qualities rayon has earned a well-deserved place in the textile family. Just as rayon has displaced silk in many of its uses, so it is making further inroads in fields formerly restricted to long-staple cotton. Leading rubber manufacturing companies have marketed passenger-



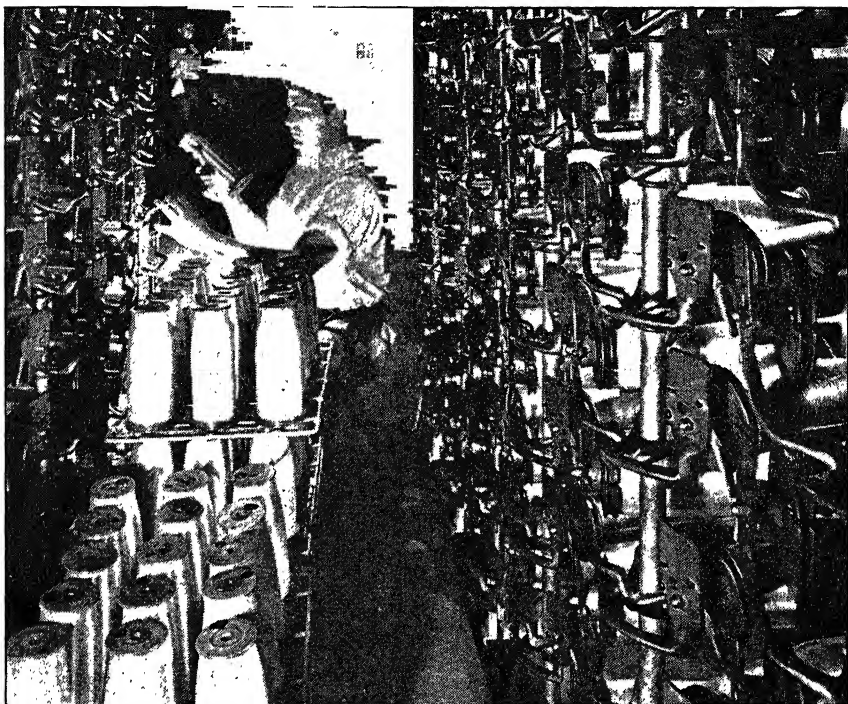
Courtesy E. I. du Pont de Nemours and Company

The manufacture of nylon from coal, air, and water. Here the nylon is being put into the hopper of the spinning machine. It will there be melted and will emerge in the form of threads. These will be made into stockings, brushes, threads for surgeons' use, and tennis-racquet strings.

car tires made of rayon, and it is claimed that these tires will give considerably more mileage than those constructed of cotton fabric. Rayon tires are also used on trucks because it has been found that they generate less internal heat, one of the causes of tire deterioration.

Rayon fiber is also combined with silk, cotton, wool, and linen. Farsighted textile manufacturers were quick to see the competition that they would have to meet from this textile. They met this competition by turning to rayon itself and made in their own plants fabrics of rayon or of rayon and other material combined. Some who did not make this change found it difficult to continue in business.

In making rayon, wood pulp or cotton linters are treated chemically by what is known as the *viscose process*, whereby a semiliquid substance is produced. This is forced through a nozzle with very tiny openings, thus producing the threadlike fiber. World production increased to an annual output of almost two billion pounds. Raw silk comes from regions where labor is cheap and where the climate is suitable for the growth of mulberry trees. Rayon centers have developed in regions where textile industries were well established and where chemical research was well advanced. The cheap



Courtesy E. I. du Pont de Nemours and Company

The manufacture of "Cordura" rayon. This yarn is made expressly for the manufacture of fabric for bus, truck, and passenger tires. Tires made of this yarn give from two to three times more wear than ordinary tires. It is also used in making airplane tires.

labor of Italy and Japan favored the production of rayon in those countries. Japan led the world in rayon production, followed by Germany, the United States, Great Britain, Italy, and France. Japan took world leadership away from the United States in 1936 in rayon production by producing 320,000,000 pounds of the total world production of 1,319,000,000 pounds. In 1937 both Japan and Germany surpassed the United States, Japan's production being 509,105,000 pounds of a total world production of 1,805,740,000 pounds. Japan achieved preëminence in this industry in spite of the fact that basic raw materials must be imported.

Nylon. Late in 1938 a new synthetic fiber was announced as a successful competitor of raw silk and of rayon. It is called *nylon*. From it filaments much finer than those obtainable from raw silk can be spun and the resulting yarns are very strong. It was first used for the manufacture of sheer hosiery. It is now in great demand for the manufacture of parachutes. Used nylon stockings are being collected the country over and the material used again by parachute manufacturers. Unlike rayon, which is a cellulose product, the three basic sources from which nylon is derived are coal, water, and air.

GUIDES TO STUDY

1. What is meant by the statement, "Cotton goes to war"?
2. Where is the "Cotton Belt"? What are its natural boundaries?
3. What kind of cotton is grown in our Southwest? Why?
4. Describe the processes in the growing of cotton.
5. What is the boll weevil and how does it reduce the cotton crop?
6. What is the danger of growing too much cotton?
7. What is ginning?
8. What use is made of cottonseeds?
9. What are linters and what use is made of them?
10. Why did the New England states which are so far from the cotton-growing regions lead in cotton milling for so many years?
11. Why has the South forged ahead in the cotton industry recently?
12. What countries have been the best markets for our raw cotton? Why?
13. What advantages have woolen textiles over cotton?
14. What advantages have cotton textiles over woolen?
15. Where were the first woolen mills in the United States? Why?
16. What are the sources of wool for mills?
17. What countries lead in the production of silk? Why?
18. Why have articles made of silk been considered desirable? For what is silk indispensable?
19. Why has our supply of silk been cut off?
20. What substitutes are taking the place of silk?
21. What is rayon? How is it made? What are its uses? Why?
22. What is nylon? In what ways is it being used?

TOPICS FOR CLASS DISCUSSION

1. The cotton-growing areas of the world.
2. Cotton goods were once luxuries.
3. The share cropper of the South.
4. Fighting the boll weevil.
5. What Eli Whitney's invention did for the South.
6. How the first cotton gin affected Old England and New England.
7. Why wool keeps us warm.
8. Where woolen goods are mostly used.
9. Where cotton clothing is mostly worn.
10. Why we do not produce raw silk.
11. Rayon competes with cotton and wool.

WORK TO BE DONE

1. On a map of the United States indicate by color or by lines the chief cotton-growing areas of the country. List the conditions which make this the leading cotton-growing region of the world.
2. Make a thorough study of cotton growing from seed to factory. Why is cheap labor essential?
3. Appoint a member or a committee to learn how the Federal Government has tried to help the cotton grower.
4. Study and report to the class on the life of Eli Whitney. What great contribution did he make to bring about mass production?
5. Make a collection of fabrics—cotton, wool, silk, rayon, etc. Study the

UNIT IX. AMERICA'S POWER RESOURCES—OUR DRIVING FORCE

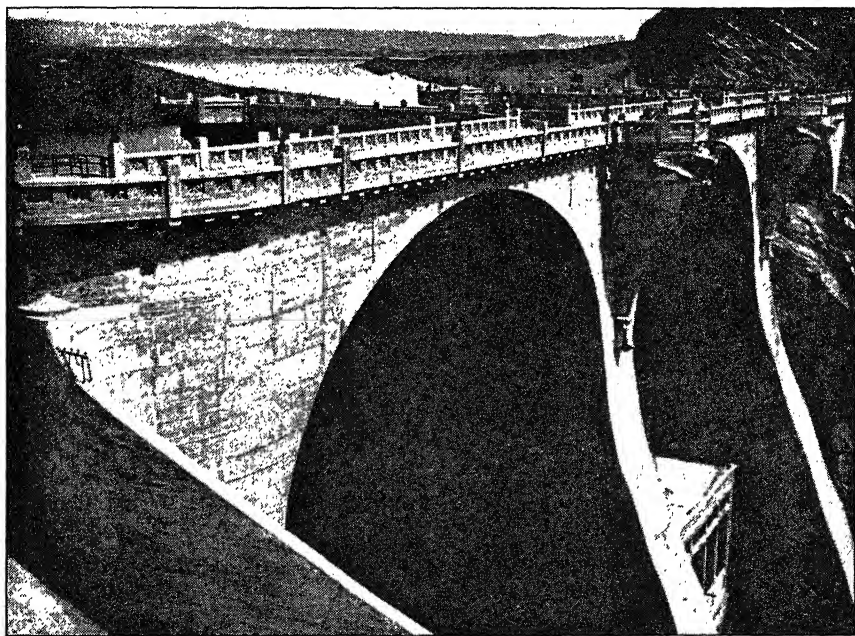


Photo by James Sawders

Coolidge dam on the Gila River, a tributary of the Colorado River. Route 30 Highway uses the dam as a bridge.

WATER POWER

Water power the country over. Not all streams are useful for water power. Slow, deep rivers like the Mississippi and the Hudson are more suited to navigation. Rapid rivers, found usually in hilly or mountainous country, have more falls and, therefore, give more power. Such states as Washington and Oregon, with abundant rain and fast-flowing mountain streams, have the largest water-power resources. However, there is a vast supply of water power scattered over the United States. The states bordering the Atlantic, with their good rainfall and rugged surface, have developed hydroelectric power most extensively in order to supply their great manufacturing industries and their large cities. In the West there is an enormous amount of undeveloped water power because manufacturing is not so prominent in this part of the country. However, electric power is being used more and more in the West to operate sawmills, can-



Photo by James Sawders

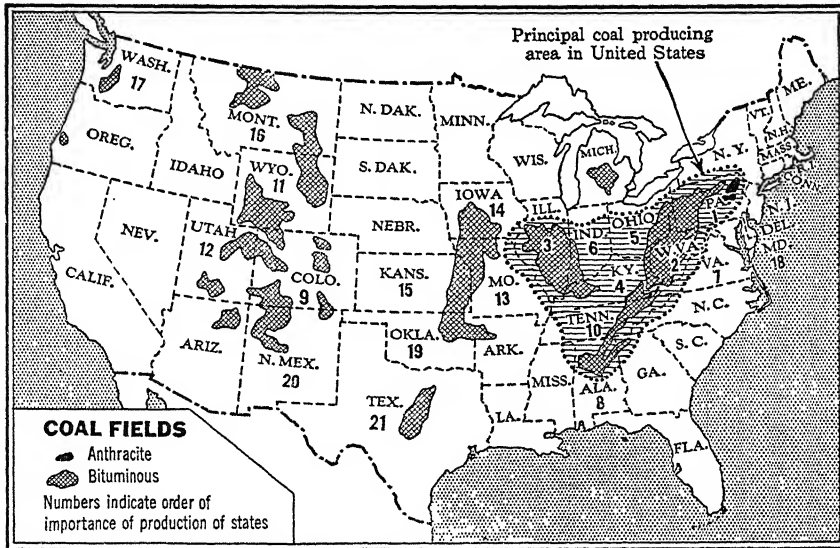
A coal-cutting machine in a mine near Pittsburgh. The undercutting is done in preparation for blasting. Pennsylvania and West Virginia lead all other states in the production of soft coal.

neries, mines, railroads, farm machinery, and lighting plants. Power from the Bonneville Dam and the Grand Coulee Dam is now being used in the production of aluminum. Even in the Middle West, where coal is plentiful, electricity is extensively used. Great transmission lines of high-tension wire carry this power over great distances.

More than thirty-five per cent of the electricity used in the United States today is generated by water power. The great Government hydroelectric developments in the Tennessee Valley and the Far West have added enormously to our electric energy for domestic and industrial uses. The Grand Coulee plant when its power is fully utilized will furnish energy exceeding that of any other plant in the United States.

COAL

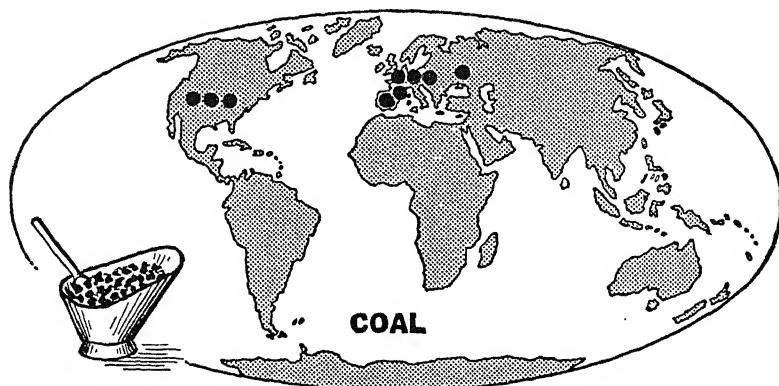
The importance of coal. It has been said that only food and water are greater necessities than coal. A businessman, arising in the morning, presses a button and his house is lighted by electricity, perhaps generated by coal. His house may be heated or his break-



fast may be cooked by coal or by gas or electricity from the same source. He may ride to his business on a steam train using coal or on an electric car using power from a steam plant. His office may be in a factory whose machinery is operated by steam. His raw materials are carried to and his products from the factory on freight trains propelled by steam. What is true of the businessman is true in large measure of every man, woman, and child in the country. The life of each one of us is largely dependent upon coal. Coal is one of the greatest assets a country can have.

While water power is very valuable, there is not enough of it available to do all the work of the world. Steam still gives us most of our power, light, and heat. Coal is our greatest source of steam. Petroleum is more expensive, and its supply is more limited than that of coal. Some industries, like the smelting of ores, the making of steel, and certain other metal manufactures, must have coal. For these reasons coal is certain to remain our most valuable source of power.

The origin of coal. Vegetable matter which accumulates in the bottom of swamps and marshes is known as *peat*. We may think of this as coal in its earliest stages. It is found in swamps in many parts of the world today. In Ireland peat is the most common form of fuel. The coal which we use today was formed from plants which grew in enormous swamps millions of years ago. When the plants, many of which were as large as our trees, fell into the water of the



Each full dot represents ten per cent of world production.

swamp, they were preserved from decay. When this material was subjected to the pressure of layers of rock which had been formed above it, lignite or brown coal was formed. Still greater pressure for a much longer time produced bituminous, or soft, coal. This in turn, under still more pressure, became anthracite, or hard coal.

The light, heat, and power which we get today from coal, petroleum, and natural gas really come from sunshine which fell on the earth millions of years ago. That sunshine was necessary for the plants which gave us coal and for the plants and animals from which petroleum was formed. This sunshine of former times has been bottled up in the earth in the form of gas, oil, and coal for millions of years waiting for a scientific age to put it to use.

Our coal supply. There is a vast amount of coal beneath the surface of the earth, but it is very unevenly distributed among the different continents. Geologists can tell about how much coal there is underlying different regions, and they call these estimated deposits the *coal reserves*. The United States is believed to have nearly half of the world's coal reserves. We mine and use more coal than any other nation, and at times we even import a little. Factories, railroads, and steamships use this coal for power; from it we also get coke for smelting iron and gas for light and heat.

The largest part of our American coal is bituminous. About seventy-five per cent of our coal is produced in the Appalachian region from Pennsylvania to Alabama. This coal is of excellent quality and is within easy reach of our great industrial centers and our Atlantic ports. In the Middle West there are also abundant supplies of good coal, which is used in the steel mills and factories of that section. Lignite, which is inferior to bituminous coal, is found in Montana, the Dakotas, and the Gulf States. Very little lignite is

used in our country because we have an abundance of high-grade bituminous coal. Besides, the bituminous mines in most cases are much nearer the industrial centers and ocean ports. However, it is well to have these resources for future use.

The only anthracite area of any importance is in eastern Pennsylvania, and the mines there supply practically all the hard coal used in household heating and cooking. Formerly we imported some anthracite from Wales and some even from Russia. There is very little coal on the Pacific Coast, but the petroleum of California and the water power of the Northwest keep industry and transportation in this section well supplied with power.

Our great coal supply has enabled us to become the greatest manufacturing nation of the world. Water power and petroleum have helped, of course, and are growing in importance; but coal is still our greatest reliance.

PETROLEUM AND PETROLEUM PRODUCTS

Petroleum in our lives. If there were no petroleum in the world, our lives would be much changed. No automobiles, trucks, or buses could move; no airplane or dirigible could fly; motorboats, submarines, and motor ships would be helpless. There would be no oil-burning furnaces, and no tractors on the farms. We should have no gasoline, kerosene, benzine, naphtha, paraffin, lubricating oil, or any of the numerous by-products of petroleum. Millions of people would have no employment, for oil wells, refineries, filling stations, automobile factories, and hundreds of other lines of business now dependent on petroleum would no longer exist. Oil indeed keeps the machinery of modern life moving. Its complete loss would be a world-wide calamity. Fortunately new supplies of this liquid power are constantly being discovered, and nature seems to be very generous in this gift to mankind.

What petroleum is. The origin of petroleum is not fully determined. Scientists believe, however, that during early geologic ages vast quantities of plant and animal remains were buried deeply among the rocks of the earth's crust. Chemical and physical changes in these materials are thought to be the causes of the formation of petroleum and natural gas. The oil and gas then collected in pools within the porous rocks and sands and were covered with layers of hard rock, sand, and clay. Oil is usually found mixed with gas and water, all under great pressure. If a hole is drilled through the clay, sand,

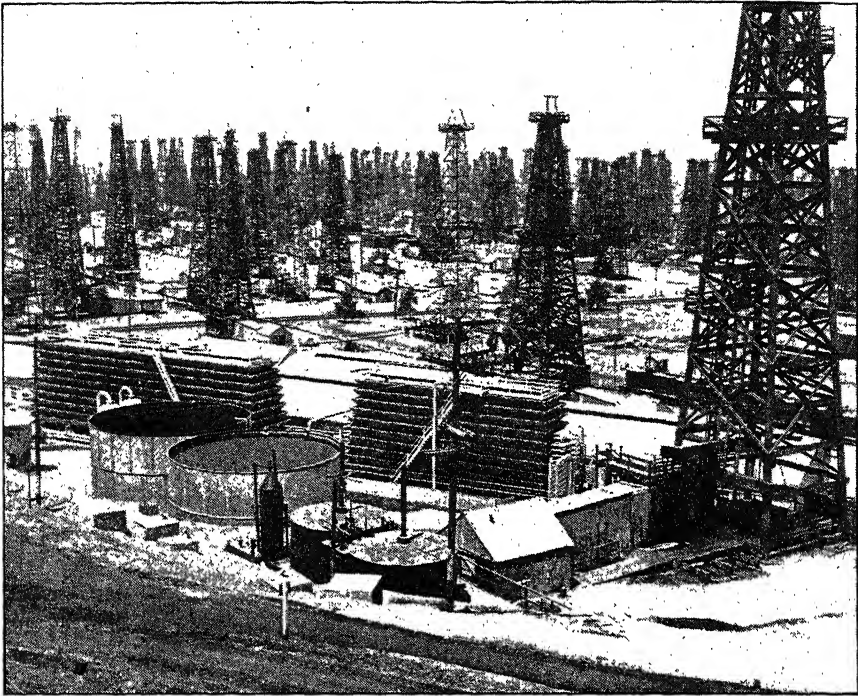
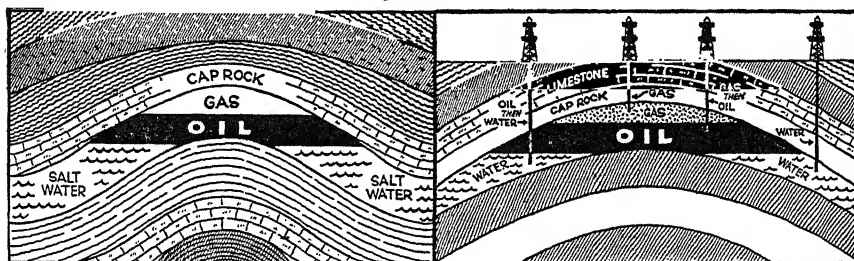


Photo from Keystone View Co.

Oil wells near Los Angeles, California. Since the Pacific Coast of the United States has little coal, it is fortunate in possessing an abundance of oil. The Army and Navy also find these fields convenient to supply the fighting forces of the South Pacific.

and rock until it reaches the deposit of oil, the pressure causes the gas, water, and oil to spout or gush up through the hole, or *well*, as it is called. Such an oil well is called a *gusher*, and it may spout oil and gas high into the air until it is controlled by being led into pipes and tanks. Sometimes oil does not gush out but has to be pumped to the surface. Oil wells vary in depth from a few hundred feet to one recently driven down 15,004 feet before oil was encountered. Wells are even driven into the ocean bed, under water, and some of these submarine oil wells are great producers. Various scientific methods are now used to determine where oil is apt to be found. Oil as it comes from the well is called *crude*, and it contains a great many different substances, which are separated by a distilling process called *refining*.

The history of oil. A small amount of oil was found by the early settlers seeping into salt wells and even in swamp water. Small quantities of this oil were sold as a medicine under the name of "Seneca Oil." It was soon found that this surface petroleum could



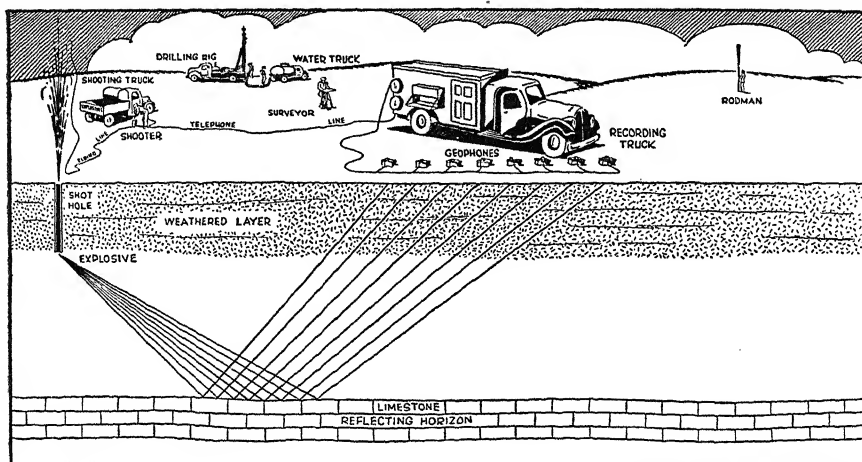
Courtesy Atlantic Refining Co.

In the diagram at the left note the relative positions of gas, oil, and water. At the top is a curved layer of compact rock through which gases cannot rise to the surface and escape. In the diagram at the right note how wells may be sunk. If the well is drilled too far to the right the oil is not discovered. If it reaches only the gas, the gas escapes and does not force the oil out of the ground as it will if the well passes through the gas to the oil.

be refined so as to produce an oil that could be burned in lamps. Before this time all light was obtained from candles or whale oil. These were expensive and not very satisfactory, and the new oil was in great demand. This led to experiments in drilling wells to get petroleum; and in 1859 Col. Edwin L. Drake first "struck oil" at Titusville in Pennsylvania. From that small beginning a vast industry has developed. Pennsylvania is no longer an important oil producer; the great oil fields of the South and West now produce more than sixty per cent of the world's petroleum. The refining, transportation, and sale of petroleum and its many by-products are among our greatest sources of wealth.

Many products, many uses. The *refining*, or distilling, of petroleum breaks it up into the products named in a previous paragraph (p. 277). Of these gasoline is most in demand. This is because of the invention of the internal-combustion engine, such as that used in automobiles, airplanes, and many kinds of machinery. Fuel oil is used in place of coal to drive locomotives and steamships and also in the Diesel type of engine for heavy-duty work. Oil heating of homes, apartment houses, and office buildings had become very popular, but the shortage of oil in the East due to war demands caused many in that section to return to the use of coal-burning furnaces. Lubricating oil is essential for all kinds of machines, none of which could operate without it. The other products of petroleum are used in many of the arts and industries and even in medicine. The colored crayons with which you color your maps are petroleum products.

Oil in the United States. Our country ranks first in oil production. In the eastern field oil wells have been operated for more



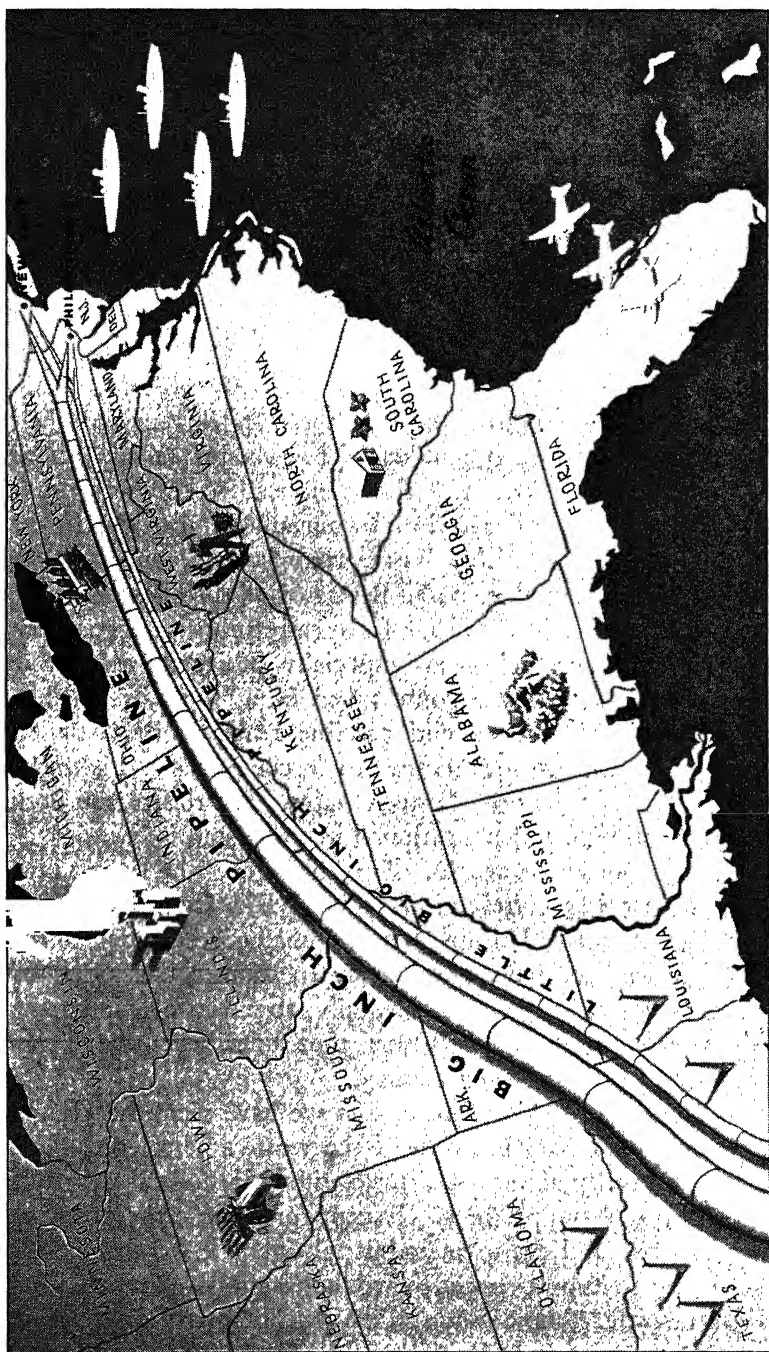
Courtesy Atlantic Refining Co.

A seismograph is an instrument used to record the presence of waves in the earth due to earthquakes perhaps thousands of miles away. Here geophones or seismographs record waves started by an explosive set off for the purpose of learning whether the earth below is likely to contain oil. In the region being explored holes are drilled one quarter of a mile apart. The lines show the route followed by the sound waves.

than seventy-five years, and production still continues, but not in very great quantities. Most of the eastern wells are in the bituminous-coal country on the Allegheny Plateau. The Mid-continent area includes the oil fields of Kansas, Oklahoma, Arkansas, northern Louisiana, and all of Texas except the Gulf Coast. Its production surpasses all other parts of the country at present. The California field is next in production, and a very small amount of petroleum is obtained from the Rocky Mountain region. Production is increasing in the Gulf field, especially in Louisiana, where oil wells are being sunk in the Gulf bed and large returns are being realized.

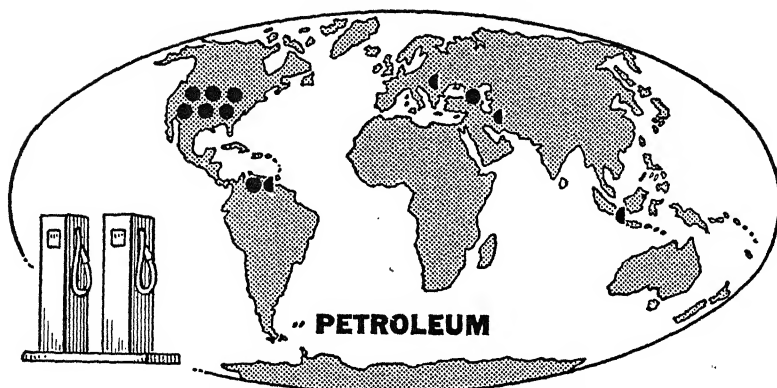
Transportation of petroleum. There are more than four hundred refineries located in thirty-three different states of our country. Many refineries are located in the Eastern States so as to be near the great industrial centers and the Atlantic ports. The crude oil reaches these refineries in various ways. A great deal is pumped through long pipe lines, some of which extend nearly fifteen hundred miles across the country. These pipes vary in diameter from two to twenty-four inches. Great pumps are located at points twenty-five or thirty miles apart, which force the crude oil through the pipes, over the mountains, and across the plains.

Oil for the Eastern States. Almost with the beginning of the war there developed a shortage of gasoline and fuel oils in the states bordering the Atlantic. This shortage became more and more acute



The "big-inch" pipe line recently finished to carry petroleum products from Texas to the East Coast. Oil transported in this way shortens greatly the shipping line to Europe. It also overcomes the submarine menace to the water route through the Gulf of Mexico to the East Coast.

Courtesy Westinghouse



Each full dot represents ten per cent of world production.

as the war progressed. Before the war these states received their petroleum products chiefly by means of large ships called *tankers* plying from the Texas Coast and the Caribbean. The war needs those tankers to carry gasoline and oil to our allies and to our forces in nearly all parts of the world. Furthermore, petroleum products on their northern route to Britain and Russia or on their eastern route to the Mediterranean find the voyage from eastern ports shorter than from Gulf ports. Since tankers are especially subject to submarine attack, it is important that the route taken be as short as possible. Consequently much of the oil and gasoline reaching the Atlantic Coast by rail and tank car finds its way to foreign lands and is therefore not available for use in the Eastern States. For this reason both fuel oils and gasoline have been rationed in those states.

Greatest subway in the world. The "big inch," the largest pipe ever used for carrying petroleum, had been laid from Longview, Texas, to Salem, Illinois. This line has recently been extended to the East Coast. It was constructed primarily to shorten the route for tankers across the Atlantic and, incidentally, to aid in providing the East with petroleum products. Other pipe lines from the Texas fields to the East Coast are being planned.

World production of petroleum. As we have seen, the United States produces about sixty per cent of the world's petroleum. We have exported annually about a quarter of a billion dollars' worth of petroleum and petroleum products. Except for Russian there is very little oil in Europe, and the great industrial countries of that continent were forced to import almost their whole supply. Soviet Russia is second only to the United States in its yield of petroleum; but its oil areas are located far from the industrial centers. Rumania is the only other large oil producer in Europe, and it was able to export

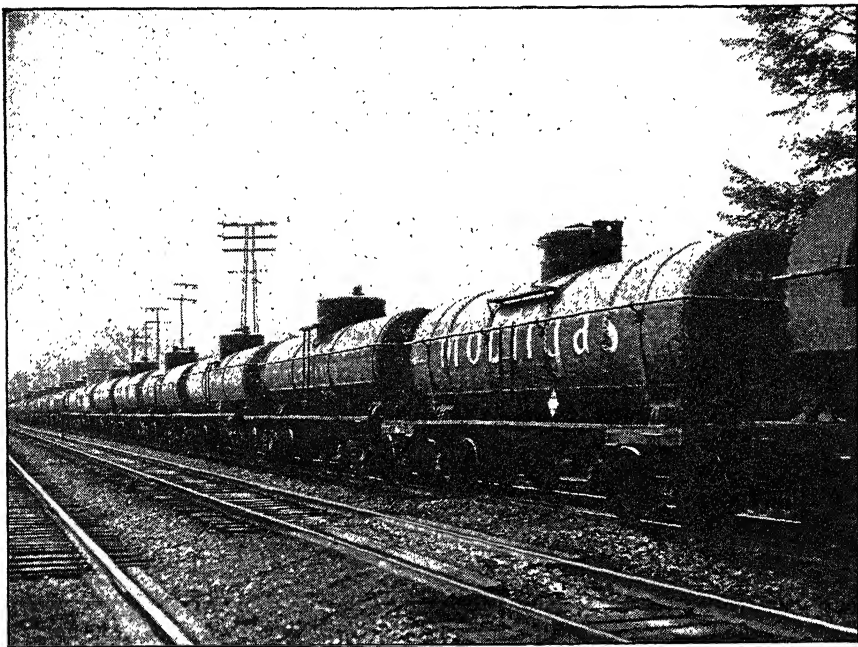


Photo from Free-Lance Photographers Guild

Tank cars which carry gasoline, lubricating oils, and fuel oils from Texas and Oklahoma north through Illinois to the North Atlantic Coast. These products of petroleum are either shipped to our fighting forces or are used in the Eastern States.

considerable gasoline and fuel oil. It was from these fields that Germany obtained one third of its supply of oil. Other important petroleum-producing countries are Venezuela and Persia. Several great companies have concessions allowing them to develop these foreign oil fields. They pay a percentage of the profits, called a *royalty*, to the foreign governments, and in return they enjoy the exclusive right to produce oil there. The governments of the great powers are much interested in these oil concessions since gasoline and oil are very necessary in their military and naval activities.

NATURAL GAS AND HELIUM

Natural gas and its uses. Natural gas is usually found with petroleum, but it may exist alone. When a pocket of gas is first tapped by the drill, the gas blows out with great force and may do considerable damage before it is controlled.

The chief value of natural gas comes from the fact that it burns with great heat. While it is used to some extent for lighting, its greatest use is for fuel, both domestic and industrial. Ordinary illu-

minating gas is made by heating coal in *retorts*; the gas escapes, leaving coke as a by-product. Natural gas is much cheaper if it does not have to be piped too far. At the present time natural gas is piped from Texas and Oklahoma to Chicago, Washington, and other large cities, as well as to Mexico and even as far as Canada. It is used in drilling oil wells, operating refineries, and generating electricity. Large quantities of gasoline are obtained from natural gas. Carbon black, used in the rubber industry and in making printing inks, is made from natural gas and is its most important by-product. Natural-gas wells stop producing after five or six years; but new ones are constantly being brought in; so our use of this fuel is steadily increasing.

Helium. Another valuable gas is helium, which has come into prominence on account of its use in dirigibles. Hydrogen, the gas usually used in balloons, is very inflammable; that is, it burns easily and is very apt to explode. It was the explosion of its hydrogen gas which destroyed the great German dirigible, the *Hindenburg*, some years ago. Helium is not quite so buoyant as hydrogen, but it does not burn, and hence it cannot explode. It is therefore the ideal gas for dirigibles. The United States has almost the only supply of this gas at present known and the Government controls its production, reserving it for use in army and navy dirigibles. Helium is said to have been discovered recently in France and in Trinidad, but it is still rare.

GUIDES TO STUDY

1. What kind of streams are sources of power? Why?
2. What purposes do dams serve other than in providing power?
3. In what parts of the United States is water power most extensively used? Why?
4. How has the electric current increased the use and thus added to the value of water power?
5. What advantage has coal over running water as a source of power? What advantage has running water over coal?
6. What are some of the many uses of coal?
7. What are the handicaps of a country possessing no coal?
8. What is meant by *coal reserves*?
9. How do the coal reserves of our country compare with those of other countries?
10. What are the chief uses made of bituminous coal? Of anthracite?
11. Why is lignite little used in this country?
12. What is petroleum? How is it obtained?
13. When were wells first drilled for petroleum?
14. What products result from the refining of petroleum? What are the uses of each product?

15. Where are the leading oil fields of the United States? Which are the greatest producers?
16. In what ways are petroleum and its products transported from place to place?
17. What means have recently been taken to bring more oil to the Atlantic Coast?
18. What countries lead in the production of oil?
19. What are the uses of natural gas?
20. Of what value is helium? Why?
21. Why does our Government control the production of helium?

TOPICS FOR CLASS DISCUSSION

1. Electricity may transmit water power. Otherwise water must be used where it exists.
2. Potential water power *versus* developed water power.
3. The kinds of coal and their uses.
4. The origin of coal.
5. What coal does for America.
6. The most useful products of petroleum. It has been said that the most essential product is lubricating oil. Why is this possibly true?
7. The discovery of oil fields.
8. How oil has changed "the face of the globe."
9. The "big inch."
10. How the gasoline used in your car gets from the oil well to the gas station. How it is refined and how it is transported before and after refining.
11. Dirigibles—lighter than air.
12. The interest of the United States in the oil fields of foreign countries.

WORK TO BE DONE

1. Learn the different ways in which water power is put to work. Compare the old-fashioned water wheel with the modern turbine.
2. Make a collection of the different kinds of coal. Learn how they differ. Find a picture of fossil plants found with coal. How is the diamond related to coal?
3. Make a diagram of an automobile engine showing how gasoline is put to work.
4. Learn how a Diesel engine differs from one using gasoline.
5. On an outline map of the United States indicate the oil fields of the country. Draw the pipe lines leading from wells to refineries. On the same map locate the great water-power sites. Shade in the area each serves and tell for what the power is chiefly used.
6. By what routes does oil move from the United States to the different fighting areas?
7. Make a diagram of an oil well showing the layers of rock and the presence of gas and water. Show how the well should be drilled to the best advantage.

UNIT X. FOOD IS AMMUNITION

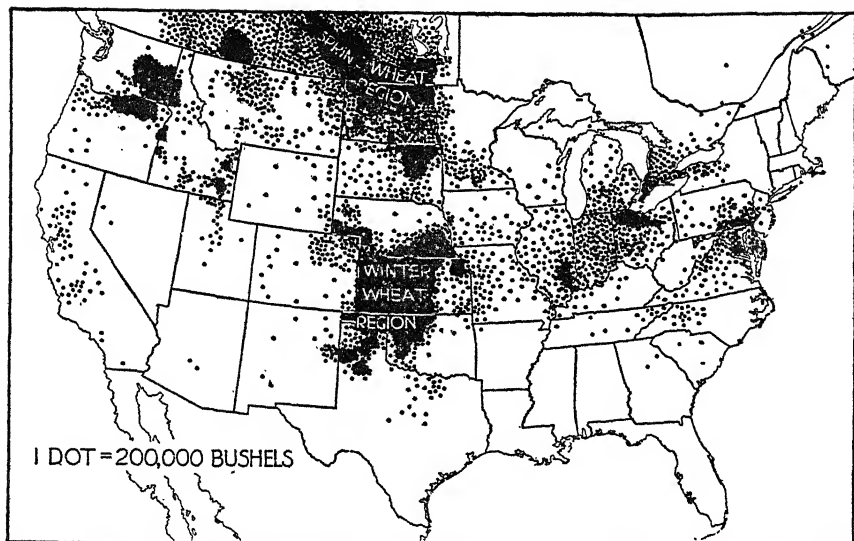
RATIONS FOR OURSELVES AND OUR ALLIES

The need of food. During World War I the demand for food was very great. Russia's grain fields were shut off from the rest of the world. The countries of Central Europe were at war and much of the farm land was being overrun by the armies. The wheat lands of the United States were extended into the semiarid lands of our Great Plains. After the war these lands were no longer cultivated and since the grass had been removed by cultivation, the bare areas were exposed to the winds which blew the soil in clouds practically to the Atlantic Coast. Thus we have our dust bowls which present to the United States Department of Agriculture a serious problem in conservation.

Following World War I and in the depression years which succeeded, there was little market for surplus crops. Farmers were limited in the number of acres they could plant to wheat, corn, and cotton. They were also limited in the number of cattle and pigs they could send to market. This policy of limiting production came to be known as our "economy of scarcity."

Now World War II makes its great demands for food. Millions of service men at home and abroad must be provided with an abundance of the best foods obtainable. Vast quantities must be sent to our allies, whose supply of agricultural labor has been reduced by the demands of their armed forces and of industries producing munitions of war. Russia and China have had large areas of farm lands occupied by the enemy, and, therefore, they could not be cultivated. In our own country our supply of labor for the farms has also been greatly reduced. Men have been drawn into some branch of the fighting forces or have been attracted by the high wages of the war plants.

The greater employment of labor of all kinds, together with the higher wages paid, increased the demand of civilians for food and as a result prices of food steadily rose. To insure a fair distribution and control the prices of those foods of which there was an especially limited supply, the Federal Government began to issue ration books. Among various foods rationed are sugar, canned vegetables and fruits, meats both fresh and processed, and some dairy products. Some of these foods are scarce because of problems involved in transportation; others because of the increased demand and of the difficulty in procuring labor.



Our country is fortunate in possessing almost unlimited possibilities for producing foods. In normal times our farms yield surpluses of wheat and corn. Our supply of meats has been sufficient for peacetimes and some animal products, such as pork and lard, have been exported in considerable quantities. Nearly all the fish caught offshore or in inland waters have been consumed at home. Relatively small quantities of fish have found a place either among our exports or our imports. We shall now make a study of the chief sources of our food supply.

1. OUR WHEAT AND CORN FIELDS

FOOD FOR OURSELVES AND TO SPARE

Wheat areas of our country. On our Interior Plains is the largest wheat area of the country. It extends from Ohio on the east to Kansas and Nebraska on the west and from Minnesota and North Dakota on the north to Texas on the south. Here the land is level or gently rolling. The rainfall which is not too heavy comes mostly in the growing season. Precipitation is light in late summer and autumn when the ripe grain would be injured by wet weather. The soil of the plains is rich in humus formed by the decay of grasses, which grew on the plains for centuries before the days of the white man and the plow. The rich soil has made it possible to grow crop after crop of wheat without the use of fertilizers.

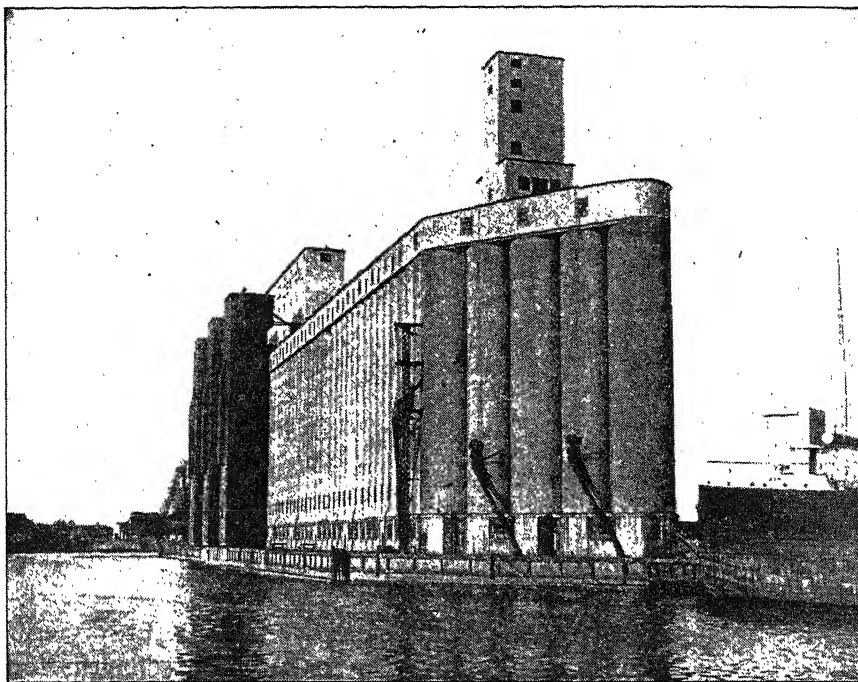


Photo by James Sawders

Grain elevators in the port of Buffalo, New York. Buffalo is the eastern terminus for ships bringing grain from the Lake Superior region. Buffalo has come to be the leading flour-milling city of the country.

This wheat-growing area extends northward into Canada which is one of the leading wheat-producing countries of the world. Some of the largest wheat farms of our own country are in the Columbia River basin of Washington and Oregon. The Great Valley of central California also produces millions of bushels of wheat.

Between the millstones. In the early days of our country each community raised its own grain and ground its own meal and flour. The miller was paid by receiving *toll* of each farmer's flour. The grinding was done by two large stones one above the other turned by water power. Many cities and towns of today owe their locations to water-power sites used long ago for grinding grain and sawing lumber.

The old-fashioned millstones proved unsatisfactory in grinding hard spring and winter wheats. But new methods of milling were devised which make of the hard wheats the very best flour. Then came the development of the Northwest into an important wheat- and flour-producing region.

Flour-milling centers. Minneapolis was formerly our own and

the world's great milling center. This importance was due principally to the fact that it is in the center of a great wheat-producing area and has good transportation and water-power facilities, being served by the Falls of St. Anthony by which large amounts of power are developed. Buffalo is now the leading flour-milling city. It is well located for both milling and marketing. Wheat raised on the Columbia Plateau goes by rail to Seattle or Portland. Here it is manufactured into flour for the local market. Both wheat and flour were formerly exported in large quantities to the Orient, Japan furnishing the most important market.

Problems of the American wheat farmer. On the majority of the large wheat farms in our country wheat is the cash crop. After planting, there is danger that drought may destroy the crop or that too much rain may cause rust. Severe open winters are hard on the winter-wheat crop. Insects, particularly grasshoppers, are serious pests. The farmer is especially concerned with market conditions. A fair price brings profit and prosperity. A low price on the other hand may bring discouragement and hardship to the whole wheat-growing area. In normal times conditions in the other wheat-producing countries affect prices in this country. When the total world crop was large, the price of wheat declined. Today the wheat farmer is doing all in his power to produce wheat enough for ourselves and to feed our hungry allies.

CORN—AMERICA'S GIFT TO THE WORLD

A new grain. For centuries before the white man came to our shores, the Indians were raising corn and storing it in the ground to tide them over between crops. Several times the Virginia Colony was saved from starvation because the friendly Indians were willing to share their supply with the colonists. The newcomers who had to live by their wits in this new and untried land quickly saw the value of this new grain as a food supply. They immediately set about clearing the land and planting in Indian fashion their few hills of corn around the burned stumps. Usually a dead fish was buried in each hill for fertilizer. These early crops were small, but they foreshadowed a mighty industry. Corn was the ideal grain for a pioneer civilization. The eager colonist saw that it grew quickly, gave a large return, had excellent keeping qualities, and was a valuable food for both man and beast. Another of its most important qualities was the ease with which it could be converted into mush

and quick breads, the *hasty pudding* and *johnnycakes* of our grandfathers. To this day Harvard University students consider it a great honor to be elected to membership in "The Hasty Pudding Club," a club which had its origin in the far-off days when hasty pudding was an important item in the bill of fare.

How we use our huge crops of corn. Today our corn crop is often three or four times the size of our wheat crop and more than twice as valuable. In spite of the excess of our corn crop over our wheat crop the majority of our families eat much more wheat than corn. As a breakfast cereal corn holds its own with wheat, but as an ingredient of bread it takes second place because it cannot be made into so desirable a commercial loaf.

Although we may have less corn than wheat cereal or bread on our tables, nevertheless corn is there but it is disguised as roast beef, pork, lamb, chicken, and turkey and as butter, cheese, milk, and eggs. About four fifths of our corn crop is fed to the animals on our farms. They, in turn, supply us with nearly all our meat, much of our leather, and as work animals help produce many of our vegetables.

Field corn—our great crop. By careful selection of seeds through the years several types of corn have been obtained. Field corn, sweet corn, and popcorn are the three chief varieties. Field corn, which is raised chiefly for animal food, constitutes about ninety per cent of our entire corn crop. Sweet corn is the corn that is used as a vegetable upon our tables, and it is the variety of corn that is canned.

The Corn Belt. Although corn can be grown in every state in the Union, the region best adapted to its growth is practically the same as the winter-wheat region. The three states that lead in its production and partially constitute the Corn Belt are Iowa, Illinois, and Nebraska. The Corn Belt is the most famous corn-growing area in the world. The land is level, and the soil is deep and fertile; summer rains give sufficient moisture; and the growing season is free from frost and long enough to ripen the varieties that produce the most abundant crops. In the cotton-growing states corn is also an important crop.

How the Corn Belt farmer is kept busy. Most of the farmers in the Corn Belt raise oats and hay and often winter wheat in addition to corn. Oats may be planted earlier than corn; it, with hay, furnishes food for the farm animals. Soon after the corn is planted, hay is ready for cutting. Corn then needs cultivation, and after this

the oat crop is ready for harvesting. This keeps laborers employed continuously throughout the summer months until the corn crop is ready for harvesting.

Fodder corn. In all the corn-growing states much field corn is raised for fodder. While yet green, the corn is cut and fed to cattle on the small farms. On the larger farms the stalks with the ears are cut into small pieces and stored in tanklike structures, called *silos*. Such fodder—called *silage*—undergoes a slight chemical change in the silo and makes excellent winter food for dairy cows and cattle that are being fattened for the market.

Corn products. After the field corn is harvested, husked, and shelled, much of it is crushed to make cracked corn or ground to make corn meal. Both have great food value for men and farm animals. Many forms of breakfast food are made in part from corn. Other products of corn used in the home are cornstarch and corn oil which is used as a salad oil and in making soap. Glucose made from cornstarch is used as a sirup for table purposes and in the manufacture of hard candies.

No doubt many other uses will be found for parts of the corn plant. Already from the stalks fiber board is being made; from the grain itself motor fuel is obtained. As new uses are found for corn, the farmers' market for this valuable crop is enlarged.

Corn in world trade. Although corn is our most valuable crop, it has played but a small part directly in our foreign trade. Of course, much of it did go abroad in the form of pork, lard, and other animal products. Not more than two per cent actually left the country as corn. We say that our corn crop goes to market "on the hoof."

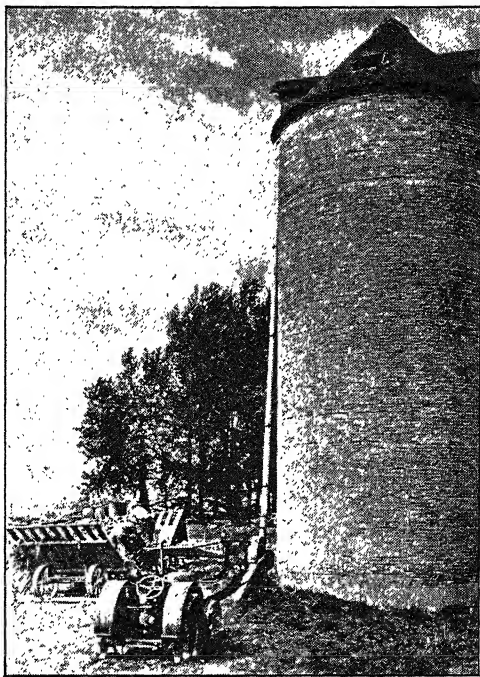


Photo by James Sawders

Filling a silo with corn in South Dakota. The corn is cut into short pieces and then blown through the tube to the top of the building. Ensilage makes excellent feed for most farm animals, especially milch cows and beef cattle.

Within the country itself corn is shipped from producing regions to other sections as feed for farm animals. But even at home the trade in the products of farm animals fed upon corn is much greater than the trade in corn. People in all parts of the country, regardless of their occupations, are benefited by the corn crop. To the consumer a bountiful crop means abundant and cheaper food. It means better business for the railroads, for the manufacturer of farm machinery, and for the banker. It would be hard to name a business which is not in some way benefited.

GUIDES TO STUDY

1. What conditions led to the formation of the dust bowl?
2. Why is there a great demand for food at the present time?
3. Why was rationing necessary?
4. What resources of our country make possible the production of food in enormous quantities?
5. What conditions are favorable to the growing of wheat? Where are these conditions found in the United States?
6. What are our chief wheat-producing areas?
7. What cities lead in the milling of flour? Why do they?
8. What are some of the wheat farmer's problems? How are they being solved?
9. Maize was the Indian name for corn. What did the early colonists learn from the Indians about corn?
10. Why was corn an almost priceless gift to the white man? How has corn helped the whole country?
11. Where is the corn belt? Why does this region favor the growing of corn?
12. What are the products of the cornfield and how are they finally marketed?
13. Why does corn play only a small part in world trade?

TOPICS FOR CLASS DISCUSSION

1. Methods of milling grain.
2. What the price of the crop means to the farmer.
3. What enters into the cost of a bushel of grain before it reaches the mill?
4. The food products of wheat.
5. The many by-products of corn.
6. In what forms the city dweller buys corn.
7. Forms in which the United States may export corn.

WORK TO BE DONE

1. Study our country's food-producing regions. Note the foods which come to your locality and learn from what parts of the country each comes.

Find why each region is adapted to the commodity it produces. What foods produced in your state are sent to other parts of the country? How does the city worker pay for his food? How is the farmer paid for producing the food? (Use terms other than money.)

2. Trace the movements and processing of wheat from farm to baker.
3. What animals help to send corn to market "on the hoof"?
4. On an outline map of the United States indicate by color or shading the leading wheat-producing areas; the chief corn-producing areas.
5. Locate cities which owe their importance in part at least to these two grains.
6. Show by means of a graph the comparative production of wheat by the United States and other leading countries.
7. Make a similar graph for corn.
8. Make a study of the improvement in methods of raising wheat and corn in the past 100 years. The improvement in milling in the same time.

2. PRODUCTS OF OUR GARDENS, TRUCK FARMS, AND ORCHARDS

FRUITS AND VEGETABLES AT ALL SEASONS

Vegetables as foods. While we can live without fruits and vegetables, we cannot keep our bodies in good health without them. The digestive system needs the bulk which vegetables supply; and both vegetables and fruits contain valuable mineral elements and vitamins. Minerals are necessary for the building of various kinds of body tissues. Vitamins are certain properties of foods which promote bodily growth and aid in the prevention of disease. New vitamins are constantly being discovered; and fruits and vegetables are rich in these health-giving factors. In addition to these values, vegetables and fruits give a pleasing variety in our diet.

In the days of the sailing ship, when voyages were long and the crew's mess was limited to salted foods and crackers, sailors were commonly afflicted with a disease known as *scurvy*. It was found that this disease was due to a lack of vegetables and fruits in the diet. Laws were then passed by various countries requiring shipowners to provide fruits and vegetables as a part of the sailors' bill of fare. British sailors are called *limejuicers* because British law requires that all sailors be given a regular allowance of lime or lemon juice.

The world's gardens at our doors. Since people in all parts of the country are so anxious to have vegetables and fruits on their tables the year round, a great marketing industry has grown up to supply these needs. Formerly it was hard to get green vegetables and

fresh fruits in the cold winter months. Now, however, cold storage and rapid transportation make it possible for us to have the fresh products of the farm and orchard at all seasons. Our Northern States get fruits and vegetables in the winter not only from our own Southern States, but from Mexico and the West Indies as well. In early summer the Northern States supply their own needs and even ship products to Canada. In the latter part of the summer, when our crops are all harvested, we get our late vegetables from the farms of southern Canada. There is, of course, also a constant exchange between different sections of the country of products which grow only in particular regions. Many areas in our country famed for their orchards and gardens would not find it profitable to carry on these industries if it were not for modern methods of transportation and preservation of foods.

Market gardens and truck farms. To keep our markets supplied with fresh vegetables, two types of occupations have been developed, *market gardening* and *truck farming*. The truck farm is larger than the market garden and usually sends its products to more distant markets.

Market gardens are found near all our large cities, which they supply with huge quantities of vegetables of all kinds. These market gardens are cultivated intensively. Exactly the right kind of fertilizer is used, the crop is planted as early as possible, the soil is kept free from weeds, and insects and plant diseases are controlled by spraying. Harvesting is done carefully, and the produce is rushed to the market, where it brings a good price because of its earliness, its freshness, and its high quality. Market gardeners try to use their valuable land in such a way that they can secure two crops from the same area each year. This is done by planting a quick-growing crop like spinach, harvesting it promptly, and following it with something like late beans.

Often the market garden has a hothouse where plants are raised for early transplanting in the open fields. Such products as cucumbers and tomatoes are sometimes raised and ripened entirely under glass. The operation of a hothouse is expensive, but, when it is close to a large city market, the saving in transportation cost makes it profitable. Hothouse products command a much higher price than those raised in the open.

On the truck farm the same intensive methods are used, and the same effort is made to get crops early so as to secure good prices.

Getting crops to market. Before the days of rapid transporta-

tion and cold storage, potatoes, cabbages, and root crops were stored in underground vegetable cellars where they kept in excellent condition. This method is still used in country districts far from railroads. But in the cities and towns the demand now is for fresh vegetables the year round. Fresh beets, carrots, and cabbages are sought by the customers even in winter and early spring. If they cannot be supplied by local growers, they are brought by fast trains or trucks from distant states and sold at reasonable prices.

The motor truck has been a great timesaver for the farmer. Instead of driving his horses all night in order to get to market in the early morning, he now reaches the market in a short time. Rapid transportation has thus extended considerably the market-gardening areas. Fast freight trains have also greatly benefited truck farmers. They transport the products of California, Texas, Georgia, Florida, and other distant states to the cities of northern United States and even to Canada.

Canning centers. Canning is also an important factor in giving us fruits and vegetables throughout the year. Canneries use enormous quantities of the surplus products of farms and orchards. In many places this industry has become so important that large farms are operated entirely to supply the canneries located near by. To provide the quantity and maintain the quality of certain brands of vegetables and fruits the cannery owners tell the farmers exactly the kind and the amount of crops to raise.

The leading states for vegetable canning are California, Maryland, Wisconsin, and New York. California puts up nearly all the canned asparagus of the country. Illinois leads in corn canning; Maryland produces about one third of our canned tomatoes; and Wisconsin provides about one third of our canned peas.

The Chesapeake Bay region of Maryland and Delaware has many advantages as a canning center. The many inlets of the bay keep the temperature mild through a long growing season. They also give excellent water routes to carry the farm products to the canneries. Finally, the region is close to the great centers of population of the Eastern States; so canned goods can be marketed at small cost for transportation.

How canning helps. Canned goods help the consumer because they are usually cheaper than fresh vegetables, especially in off seasons, that is, when fresh fruits and vegetables either are out of the market or are very high in price. Canned products go to markets which fresh produce cannot reach, such as country stores far from



Photo by Jack Manning from Black Star

Trays of vegetables being dehydrated for shipment to our fighting men, our allies, and peoples we are helping to feed after being freed from the Nazis

the railroad. They are very convenient for use on camping trips, on cruises, and for exploring expeditions, and they are easy to pack for export.

Canning also helps the farmer by giving him an outlet for his surplus crops which he might have to sell at a loss or throw away when the market is oversupplied. Truck farmers especially benefit from this fact, for they can often sell to canneries at a better price than they could get in the open market.

Food preserved in other ways. Vegetables, fruits, and meats are now frozen while fresh and preserved in the frozen state in perfect condition until they reach the consumer. Like canned foods they may be eaten in any place at any time if it has been possible to keep them frozen. In this way we may have in midwinter corn on the cob, green peas, berries, indeed almost any kind of food which was once limited to certain times of the year. Fruits, vegetables, milk, eggs, and other foods are also preserved by dehydration, or drying. This process not only preserves the food, but it also reduces

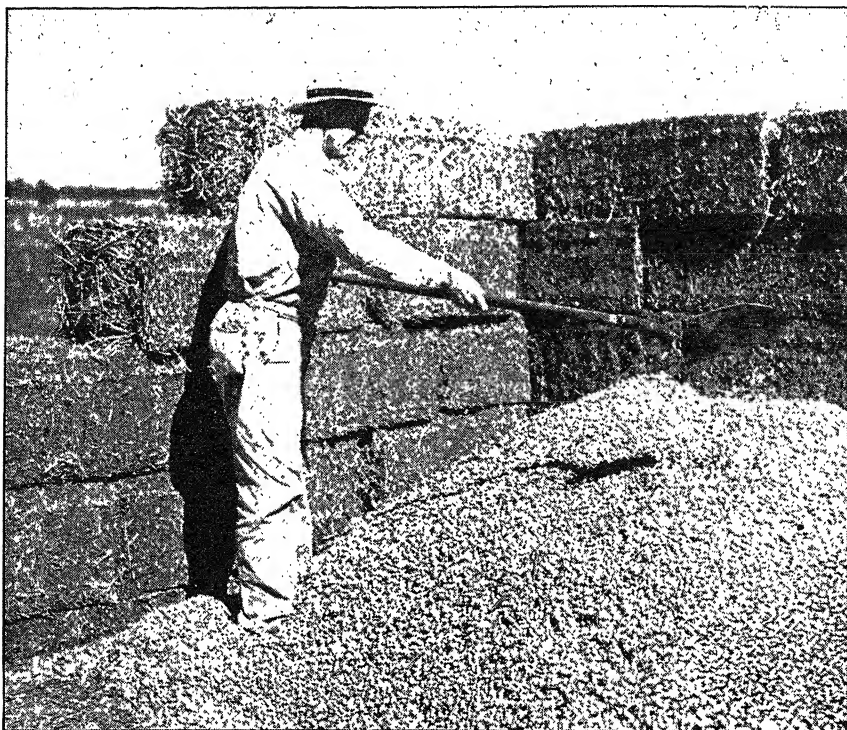


Photo by James Sawders

Harvesting the crop on one of the large potato farms of Aroostook County, Maine

the weight and bulk and the need for so many containers, thereby reducing the amount of shipping space needed, a very important factor when shipping space is at a premium.

The potato—our leading crop. If you were asked to name the most valuable vegetable crop in the United States, would you think of the potato first? It is a fact that the value of the potatoes raised in the United States each year is usually greater than that of all other vegetables combined. The leading potato-growing state is Maine. Aroostook County in the northern part of that state produces an enormous crop every year. It is a one-crop county. A good crop with high prices brings prosperity to the farmers and the businessmen. A poor crop or low prices mean a lack of ready money and hard times. Maine potatoes go to the markets of the Northeastern States, and Aroostook seed potatoes are sent to all parts of the country. Many of the early potatoes of the South are raised from seed potatoes shipped from Maine. Florida, Texas, California, North Carolina, Virginia, and New Jersey send potatoes to the northern markets in the spring and early summer before the Maine crop is ready. The Far West is making a bid for the high-grade potato market by careful grading. The Idaho potatoes, for instance, because



U. S. D. A. photograph by Forsythe

Peanuts from the picking machine, surrounded by baled vines to be used as hay

of their shape and size are excellent for baking. In distant markets they are sold in small packages or by the dozen. Dehydrated potatoes are being sent overseas to our fighting forces and to our allies.

Peanuts. Peanuts, grown in the Southern States, are also an important food product. The peanut has many uses. It is eaten roasted, is made into various kinds of candy, and is used in the form of peanut butter. It yields an oil and provides many interesting and profitable by-products. Many of these by-products were developed by Dr. George Washington Carver, a Negro scientist of Georgia. He produced from the peanut such varied articles as cheese, breakfast food, linoleum, axle grease, soap, face powder, wood stains, dyes, drugs, flour, floor-sweeping compounds, insulation material, cattle bedding, and stock feed. At first Dr. Carver urged the farmers of the South to plant peanuts because they add nitrogen to the soil by means of the bacteria in their roots. This crop was particularly useful on lands which had become exhausted by repeated crops of cotton. Peanuts are raised in sections of the South where the ravages



Photo by James Sawders

A grove of date palms in Southern California. What does the picture tell of the climate? How does the climate here compare with that of Mediterranean countries? In what respects?

of the boll weevil have made cotton growing unprofitable. Peanuts are also raised as feed for hogs. The animals are allowed to enter the fields and dig the nuts for themselves. The states leading in the production of peanuts are Georgia, Alabama, North Carolina, and Virginia.

FRUITS

Their food value. Most people like to eat fruits and berries, and they form an important and valuable part of our diet. Like vegetables they contain vitamins and mineral elements which are necessary for good health. When foods are cooked, many of the vitamins are destroyed. Since most fruits are eaten raw, their vitamins are retained. Fruits and berries, when ripe and fresh, are therefore excellent foods.

Fruits in the United States. Our country is so large and its climate and soils so varied that we produce many different kinds of fruits. Indeed, in a large fruit store, most of the products on display are grown in the United States. However, there are some kinds of

fruit which we cannot produce. This is chiefly due to climatic conditions, for even our warmest regions lack the continuous high temperatures needed to produce such fruits as bananas, coconuts, pineapples, figs, and dates. (Dates are raised commercially in California and Arizona and figs in California and Texas, but the quantities produced do not nearly satisfy the demand.) All these tropical fruits we have usually imported in large quantities. In peacetimes we get bananas from Central America and the West Indies, coconuts from the islands in and the countries bordering the Caribbean, figs from Turkey, Greece, and Italy, dates from Iraq, Saudi Arabia, and the United Kingdom (as reëxports), and pineapples from Hawaii. Formerly, such tropical fruits were very expensive; but improved methods of production and transportation brought them to our markets at reasonable prices. Great fruit plantations are operated under scientific management, and refrigerator steamers and freight cars make quick deliveries to our large centers of population.

Citrus fruits. Oranges, grapefruits, and lemons are called *citrus fruits* because they all come from trees belonging to the *Citrus* family. These fruits are sensitive to cold and can be successfully grown only in subtropical climates. For this reason Southern California and Florida are our two most important centers for the raising of these products. Even in these regions frosts sometimes kill not only the fruit buds but the trees themselves. When the frost is light, orchards can be protected by smudge fires built among the trees. But growers become extremely worried when the temperature nears the freezing point.

Florida produces more than seventy-five per cent (in some years as much as ninety per cent) of the total grapefruit crop of the United States while California grows about two thirds of all the oranges and nearly all the lemons raised in this country.

California oranges are about half navels and half Valencias. The navels are in the market from November to May, and the Valencias from May to November. Florida oranges are most abundant in the late fall and winter.

Southern Texas is also an important region for growing oranges and grapefruits as well as vegetables for northern winter markets. Harlingen in the Rio Grande Valley is the center of this fruit district.

World production of citrus fruits. For many years Spain grew more oranges than any other country in the world. Italy, Algeria, Palestine, Syria, and Greece are all important producers of oranges.



Photo by Pinney from Monkmeyer

Gathering apples in New York State. Many city women volunteered for this work because of the farm-labor shortage.

The Union of South Africa and Australia now supply themselves with homegrown oranges and are entering world markets with exports, especially to England. Although Chinese oranges are not so well known, large quantities of this fruit have been grown in China for many centuries. In fact, the orange is thought to be a native of southeastern Asia. It was brought to America by the early Spanish missionaries, and now the two leading producing countries are in the New World—our own country and Brazil.

In Puerto Rico many oranges grow wild in the mountains and along the roads. These wild trees were originally planted as shade for the coffee trees or as hedges. They receive little or no care at present; but, strangely enough, they produce fruit of excellent quality.

The grapefruit is a newer fruit than the orange and is not so widely cultivated. More than ninety per cent of the world's crop is produced in the United States. The West Indies and South Africa grow some grapefruits. The West Indies and Mexico raise most of the limes of the world. Southern Italy is one of the leading regions for the growing of lemons.

Apples. The most popular and widely cultivated fruit in the United States is the apple. It is excellent for cooking in different forms; and many varieties are highly prized for table use. It keeps well and so is available for use the year round. Such fruits as the peach, plum, and cherry may be more delicious, but none has such desirable qualities as the apple. The apple may well be called America's leading fruit.

New varieties. There are a great many different kinds of apples, and new varieties are constantly being developed. The method of developing new varieties is very interesting. Seeds taken from any apple will produce trees which will bear fruits quite different from the original apple. The only way to perpetuate an individual type of apple is by grafting or budding. This is done in the following manner. A bud or twig of the chosen tree is inserted under the bark of another young apple tree of any kind so that the two parts will grow together. The bud or twig will become a part of the new tree and will yield exactly the same as the tree from which it was cut. From these new branches buds or twigs are grafted into other trees. Thus the new variety of apple is multiplied indefinitely, and a new type of apple is made plentiful. New varieties of other fruits are grown in the same way.

Apple areas. Apples are grown in nearly every part of the United States though some areas are more productive than others. The only place where the apple does not thrive is in the hot moist parts of the South. Some varieties will not stand the extreme cold of the North; but there are hardy apples that do well in Canada.

Pacific Coast apples. One of the best apple-growing regions in the world is just east of the Cascade Mountains in Washington and Oregon. While the climate is quite dry, excellent irrigation systems supply enough water for the trees; and the long weeks of sunshine give the fruit a beautiful color. The Yakima and Wenatchee Valleys of Washington and the Hood River Valley of Oregon ship apples not only to all parts of the United States but in normal times also to many parts of Europe. The fruit is carefully harvested, graded, wrapped, and packed in boxes. It commands high prices as fancy fruit. Washington leads all other states in apple production. This region also grows peaches, pears, and other fruits.

The Great Lakes apple region. In apple culture it is not good to have the buds come out too early in the spring because a late frost may then destroy the buds and ruin the crop. The region about the Great Lakes has an excellent climate for apples and other fruits.

Since large bodies of water warm up slowly, the surrounding lands remain cool until quite late in the spring. Thus the cool winds from the Great Lakes keep the adjoining lands cool. This prevents the fruit buds from swelling too early, and the danger from late frosts is thus avoided.

In the same way, because water cools slowly, early fall frosts are warded off by warm air from the lakes. This tempering influence of the near-by lakes accounts for the large apple, peach, and grape crops of the Great Lakes region.

New York was for many years our leading apple-growing state. It now ranks second only to Washington. Western New York also does an extensive business in growing young trees for the general market. Places where these young trees are grown are called *nurseries*.

Southern Ontario is an important fruit-growing region which benefits from the great expanse of lake water to the south. This region specializes in more hardy varieties of apples than those of New York State. Nova Scotia, another Canadian province, raises a large apple crop, much of which is exported to Great Britain.

Other apple areas. In the Appalachian valleys from Pennsylvania to Virginia we find another region where fine apples have been grown since the days of the first settlements. Indeed the Virginia Piedmont was exporting apples to England long before the Revolution.

New England is another old and prolific apple-raising region. Farmers here found very early that the uneven and rocky soil was better suited to orchards than to general farming. Many fine varieties of apples are produced in New England, and the development of commercial orchards is increasing. The New England colleges of agriculture now specialize in fruit culture. One great advantage enjoyed by New England apple growers is that they are near the great markets of the eastern cities.

Missouri and Arkansas raise fine apples on the Ozark Plateau. This is a natural apple country, and it has many orchards of considerable size. Large nurseries have also been established in this section. From these and other smaller areas American apples have been sent into many European markets.

Peaches. The peach is less hardy than the apple and is more subject to damage from late spring frosts; but it is widely grown in the United States. The largest commercial crops are raised in the warmer parts of the country. However, just south of Lake Ontario,



Photo from Keystone View Co.

Malaga grapes in Southern California. Notice the name on the boxes. How do the climate and the products of this region compare with those of the country from which the ancestors of these men came?

in New York State, the tempering influence of the lake allows good crops to be grown; and peaches are successfully produced even as far north as New England.

The leading peach-growing area of the country is the Great Valley of central California. This state holds first rank in this crop. Georgia is second to California in production and, with Delaware, sends large quantities of peaches into the eastern markets.

Grapes. California produces about ninety per cent of all the grapes grown in the United States. Many of the California grapes are of European varieties which were originally brought there by the early Spanish missionaries and settlers. One half of the California grapes are raisin grapes and about one fourth are used in the manufacture of wine. More than 300,000 tons of table grapes are sent to all parts of the United States from California. Of the relatively small quantity of grapes exported the larger part goes to Canada.

The grapes of the eastern United States are entirely different from those of Europe. They have been developed from the native vines of that region. They do not keep well and are used chiefly as a table fruit and for preserves and jellies. Western New York, northern Ohio, and southwestern Michigan are also important grape-growing regions. Considerable quantities of grapes are also produced in southern Ontario.

Dried and canned fruits. Many fruits like grapes, prunes, apricots, dates, and figs are dried and sold in that form, often in attractive packages. The drying and packing of these fruits has become one of the leading industries of California. Practically all our raisins and more than half of the world's prune crop come from that state. Raisins, of course, are simply dried grapes, and prunes are sun-dried plums. The San Joaquin Valley of California, where this industry centers, has a Mediterranean climate with long, dry summers. This makes it possible to dry the fruit in the sun, which is a great advantage. We formerly exported large quantities of dried fruits to Europe, even to Mediterranean countries.

Surplus or imperfect fruit which cannot be sold in the fresh-fruit market is canned or made into some form of preserves. These processes are an important source of income for the fruitgrowers of California and other orchard states. As in the case of vegetables, fruit is often raised solely for the use of the canneries, and most brands of canned fruit are of high quality. Some fruit also is evaporated by artificial heat instead of being dried in the open sunshine. Our markets display many varieties of this evaporated fruit.

Fruit coöperatives. The marketing of so perishable a crop as fruit has always been difficult. The individual grower is not always able to get his crop harvested properly. He cannot always get it to market at just the right time. He sometimes has difficulty with commission men, on whom he must depend for the sale of his product. Western fruitgrowers have now formed coöperative associations to overcome these obstacles. The association picks, packs, transports, and sells the product. Experts see to it that the best methods and skilled labor are employed, that adequate and fast transportation is provided, and that the best prices are obtained. These coöperative associations have proved a great advantage, not only to the fruitgrowers, but to farmers in other lines as well.

GUIDES TO STUDY

1. What is the importance of vegetables and fruits in our diet?
2. From what regions does your locality receive its fruits and vegetables the year round? Why?
3. Today we demand fresh vegetables and fruits at all seasons. How is it possible for us to obtain them?
4. How does transportation by fast trains and in refrigerator cars help to conserve foods?
5. Who is benefited by the canning of fruits and vegetables? The producer? The consumer? How?
6. What are other methods of preserving foods?
7. Why is the dehydration of foods receiving much attention just now?
8. What are the leading potato-growing areas of our country?
9. What did Dr. George W. Carver do to encourage the raising of peanuts? Why?
10. Why is our country able to produce a great variety of fruits?
11. Where do we get our tropical fruits?
12. Why are California, Florida, and Texas well adapted to the raising of citrus fruits?
13. What other parts of the world produce citrus fruits? Why?
14. How are fruit trees grafted and why is grafting necessary?
15. In a California orchard there was a tree on which at the same time oranges, lemons, and limes were growing. What made such a condition possible?
16. Why do apples thrive to the east of the Great Lakes?
17. What are the leading apple-growing regions of the United States and Canada?
18. What states lead in the production of peaches and grapes?
19. What is gained by drying and canning fruits?
20. How do coöperative societies aid the growers of fruits and vegetables?

TOPICS FOR CLASS DISCUSSION

1. Vegetables, fruits, and vitamins.
2. Steps taken by the Government and other agencies to enrich foods.
3. Market gardens and truck farms.
4. Hothouses and greenhouses.
5. Canned goods—anytime, anywhere.
6. Peanuts aid the Southern farmer.
7. Johnny Appleseed.
8. Grapes, raisins, and wine.
9. Why have coöperative societies.

WORK TO BE DONE

1. On an outline map of the United States indicate by color or shading the parts of the country noted for growing vegetables and those for raising fruits. Print on the map the names of the vegetables or fruits grown in each region.

2. Note the vegetables and fruits sold in your local markets at different seasons of the year and learn from what places they come. Note when the products grown near home give place to those from distant regions.

3. Using the map you have made give special attention to the climate of each region and its relation to the crop grown.

4. Make a special study of dehydration and its advantages.

5. Make a study of the ways in which new fruits and vegetables have been obtained. Begin by listing the products purchasable today which could not be had many years ago.

6. Study the life of Luther Burbank.

7. Prepare a graph showing potato production in the United States and other leading countries. Of what part of the world is the potato a native? Why has its production become widespread?

3. OILS FROM SEEDS AND FRUITS

THEIR USE IN THE HOME AND IN INDUSTRY

Where we get vegetable oils. The seeds and fruits of plants usually contain oil of some kind. This was meant for the use of the plant itself, but man collects the seeds and fruits, presses them, and uses the oil for himself. Oil can be obtained from a great variety of plants which grow under various climatic conditions. Some of the most useful oil-producing plants grow in tropical regions where land and labor can be had at small cost.

How we use vegetable oils. We use vegetable oils in a number of ways. They are to be found in many of our foods; they form a part of the soap used in the laundry and for toilet purposes; they are in the paints and varnishes which cover the exteriors of our houses and the walls and floors of our rooms. They are in the ink with which this book is printed.

Lard and butter substitutes. Much of the oil consumed as food is used in cooking in the place of lard or butter. As the population of the world increases, the supply of animal fats is not sufficient to meet our needs. We therefore turn to the plant world to find oils that will supply our bodies with the fats needed. The vegetable oils are usually cheaper than animal fats and contain essentially the same food elements. In recent years a way has been found to add to them some of the vitamins and minerals which in former years were lacking, thus adding to their food value.

Margarine or oleomargarine is the name usually applied to a substitute for butter. Substitutes for lard have a variety of trade names. These substitutes consist mostly of vegetable oils but in most in-

stances they contain a certain proportion of animal fats. By the addition of hydrogen the liquid vegetable oils are changed to the solid form which is preferred by people of the cooler temperate regions.

Margarine competes with butter. The greater the production and use of margarine, the less is the demand for butter. In the United States farmers have caused laws to be passed which discourage the use of margarine. The product must be distinctly labeled as margarine and cannot be colored to look like butter before it reaches the consumer.

We do, however, use large quantities of cottonseed oil and coconut oil in making commercial butter and lard substitutes. European countries for years have made and have used much larger quantities of margarine than does the United States. In the densely settled regions of northwestern Europe many oilseeds were formerly imported, and large quantities of margarine were manufactured. The margarine served as a butter substitute while the cake left after the oil was pressed from the seeds made excellent feed for the stall-fed cattle. Countries, like Denmark, which specialized in the production and exportation of butter, used much margarine at home and thus had more butter for export. The seedcake fed to cows helped make still more butter for sale abroad.

Wealth from waste. One of our most useful oils comes from cottonseeds. Once these were waste products of the cotton gin, and the piles of seeds became so large and produced such a bad odor that the gin had to be moved to a new location. Now the value of the seeds in some years is nearly one third that of the cotton itself. The seeds alone have brought the farmers of the South more than \$200,000,000 in a single year.

After careful refining the oil is used in making substitutes for lard and butter. By far the greater part is used for this purpose. It is used in packing fish as a substitute for olive oil. It is also used in making salad oils and in the manufacture of soaps. The cake remaining after the oil has been expressed is used as cattle feed and as fertilizer. The United States is of course the greatest producer of cottonseed oil as well as of cottonseed cake.

Peanut oil. As we have already learned, the peanut has many uses. Under the name of monkeynut, groundnut, or goober, as well as peanut, it is raised in many parts of the world. The oil which it yields is of excellent quality and has much the same use as cottonseed oil. "Nut" margarine is made largely of coconut oil and peanut oil.



Photo from Free-Lance Photographers Guild

Piles of coconuts near Zamboanga on the western tip of Mindanao, Philippine Islands. The nuts are baked, then husked and shelled, then put through a shredding machine, then dried and baked again, and finally shipped to the United States.

The oil also is used in the industries, as in the making of artificial leather and kid gloves.

Coconut oil. The coconut palm thrives in the hot moist lands of equatorial regions. It thrives best on lands near the sea. It is found on many of the islands of the South Pacific probably because nuts have fallen into the water and have been carried by the winds to other islands, thus causing new groves to spring up. The chief producing regions are Netherlands Indies, the Philippine Islands, and British Malaya.

From the nut of the coconut palm is obtained one of our most useful vegetable oils. It is used in making margarine, soaps, and cosmetics. The dried meat of the nut is known as *copra*. The oil may be expressed from the fresh meat or from *copra*. In normal times both the oil and *copra* are exported from the producing regions.

The coconut palm is a very useful tree in its native lands. It provides oil and cake as it does for us. The milk within the nut furnishes a refreshing drink, and the meat serves as a nourishing food. From the leaves and wood materials are obtained for building houses, boats, and beds.

Oils and fats for ammunition. The war has greatly upset the balance of our supply of fats and oils. Occupation of the Philippines and other islands of the Far East has cut off our large imports of copra and coconut oil. On the other hand the demand for fats and oils has greatly increased. The need of fats for cooking is greater than ever, and the demand of munitions manufacturers for fats to be used in making explosives cannot be denied. For these reasons housewives are urged to save carefully kitchen fats and to take them to the grocer who in turn will start them on their way to the munitions plant.

Palm oil. The oil palm like the coconut palm thrives in the hot moist climate of equatorial regions. The trees are native to the western part of central Africa where they are distributed over large areas. The fruit grows in large clusters at the top of a short trunk. Each fruit consists of two parts, an outer fibrous portion containing an oily pulp and an inner kernel, or nut.

Each part of the fruit yields its own grade of oil. Oil is obtained from the outer pulp by boiling the fruits in water. Then the oil is separated either by skimming the oil from the surface or by the evaporation of the water. This oil is used as food by the natives and is put in casks and shipped in large quantities to industrial countries. Palm oil is used in the manufacture of tin plate from which tin cans are made. The thin sheets of steel are dipped into a bath of palm oil before the coating of tin is applied.

Oil is also obtained from the kernels which the natives shell by cracking them between stones or by the use of a stone hammer. As a rule the kernels are shipped to importing countries where the shells are removed by machines. The oil from the kernels is superior to that obtained from the pulp. Palm-kernel oil is used in making margarine and lard substitutes, but it is used more largely in the manufacture of soap. A large soap company controls large areas in the Belgian Congo from which it receives oil for its factories in Europe and in the United States. To bring the oil and kernels to West African ports, it has constructed railroads in the forests and operates its own ships on the rivers.

Palm oil has been produced for some years on plantations in the



U. S. D. A. photograph by Peter Killian

One of the steps in extracting oil from soybeans. This is a sort of grinding machine in which the soybeans are reduced to flakes.

Netherlands Indies. This oil produced and prepared under careful supervision was superior to that of West Africa and brought a higher price in the world markets. Although the industry of this region is relatively young, the United States imported more palm oil from the Indies than from West Africa before shipping was cut off by war.

Olive oil. This oil is obtained from the pulp of the fruit of the olive tree. The tree grows in all countries bordering the Mediterranean Sea, and it is those countries that produced and exported the greatest quantities of oil. Spain, Italy, and Greece led all other countries.

To secure the highest grade of oil, the ripe olives must be ground lightly so that the seeds will not be crushed. Only a small quantity of oil is obtained by this gentle pressure. The pressure is increased and repeated several times. More oil is forced out of the pulp, but it is of lower grade.

In Mediterranean countries where the rainfall is light and animal



Courtesy United States Department of Agriculture

The containers on the shelves hold some of the many food products made from soybeans.

fats are scarce and high, olive oil serves as a cooking fat and as a substitute for butter. It is used for packing fish, such as sardines, and is also used as salad oil. Because of the great demand for olive oil and because of its high price, it is often cheapened by the addition of cottonseed oil or peanut oil. For this reason Mediterranean countries have passed laws which make it difficult to adulterate their product. It is to their advantage to have a reputation for handling only a first-class oil.

Soybean oil. We used to think of the soybean as being mainly a source of oil for soap and paints. We also thought of it as a product of Manchukuo and China. But we are finding so many uses for the bean that we wonder where the list will end. Besides being useful

for making varnishes, linoleums, and printer's inks, it is used in making artificial leather, and for plastics, such as the steering wheel and the buttons on the panels of automobiles and airplanes. It is said that the automobile industry finds more than ten different uses for the soybean.

The cultivation of the soybean in the United States is increasing rapidly. The state of Illinois alone in 1943 planted 4,000,000 acres to this crop. This acreage is more than the whole country planted in 1939. The American people are learning very slowly to add the soybean to their diet. It is used in making small crackers, as a thickener for soups, and to some extent in making bread, but for this purpose the bean meal is commonly mixed with wheat flour.

Large quantities of soybean meal are dehydrated and sent to our allies through lend-lease. A special meal cake has been prepared for use in Italy.

GUIDES TO STUDY

1. What are the sources of vegetable oils?
2. Why are we particularly interested in vegetable oils in wartime? How does the Government try to induce us to use more margarine and less butter?
3. Why is more attention given to the production and use of oilseeds than formerly?
4. How are vegetable oils changed to the solid form? Why is this done?
5. Why does the dairy farmer fear competition with vegetable oils?
6. Why do laws forbid the sale of margarine colored to look like butter?
7. What uses are made of vegetable oils in European countries?
8. In what ways has cottonseed been found to be a valuable by-product of the cotton crop?
9. Why is the peanut a very valuable crop in our Southern States?
10. Why do we normally import large quantities of copra and coconut oil? From what parts of the world do they come?
11. Describe the oil palm and its fruit. What are the uses of the two kinds of palm oil?
12. Where are olive trees grown on a large scale? Why? In what different ways are olives used and marketed?
13. What are the uses of the soybean in the Far East? In the United States? In European countries? Why is our acreage increasing at a rapid rate?

TOPICS FOR CLASS DISCUSSION

1. Vegetable oils *versus* animal fats.
2. Uses of vegetable oils in everyday life.
3. How vegetable oils reach our table.
4. The housewife saves kitchen fats.
5. Castor oil as a lubricant.

6. The use of vegetable oils in European countries as compared with America.
7. Oilseeds in temperate lands and those from tropical lands.

WORK TO BE DONE

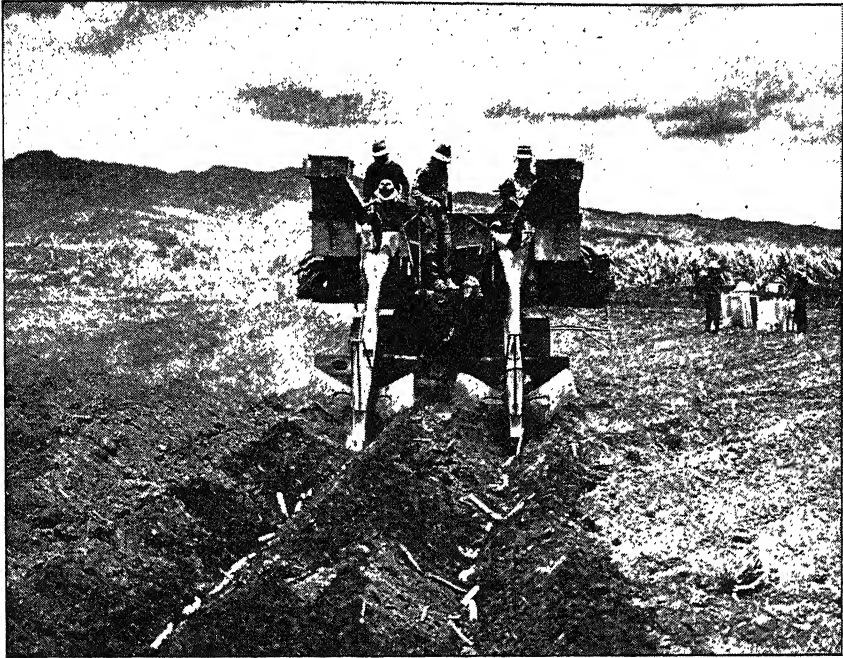
1. List the uses of vegetable oils as food; list the uses made of them in industries.
2. On a desk outline map of the world indicate the producing region of each kind of oilseed or oil-producing fruit. Draw lines indicating transportation routes from source to market. Place on the map in the proper places samples of the seeds themselves or simple drawings of the plants producing them.
3. Using encyclopedias and other reference books study and report to the class the methods of production and preparation for use of one or more of the oilseeds.
4. Choose a member of the class to write to the Department of Agriculture, Washington, D. C., for pamphlets on the soybean.
5. Write an essay on the following topic: The ways in which vegetable oils have come into my home.

4. FILLING OUR SUGAR BOWLS

SUGAR—ITS PRODUCTION AND MANUFACTURE

An important energy food. Early man, driven by hunger and entirely dependent upon nature's food supply, by tasting and testing soon found that some plants and fruits were more palatable than others. We know that it is the varying quantity of sugar that largely determines the flavor and desirability of many of our foods. Sugar is found in practically every plant that grows. In some plants it is stored in the sap, in others in the root, and in others in the blossom. When we rob the bee of its honey, we are taking the sugar which it has laboriously collected from the blossoms of the clover, the apple, or the goldenrod. Sugar was long supposed to be simply a luxury on our tables. Scientists now tell us that it is a very important energy-producing food.

So much sugar is consumed today that it has become one of the leading commodities of world trade. Here in the United States we consume more sugar per capita than is consumed in any other country. The average amount is about one hundred pounds per year for each man, woman, and child in the country. We use ten times as much as we did one hundred years ago. Not all of this sugar passes through the family sugar bucket. Much of it is used in bakeries,



Courtesy Caterpillar Tractor Company

Planting sugar cane in Hawaii. This machine plants the cane stalks and introduces fertilizer into the furrow at the same time.

candy factories, and by the makers of soft drinks. The change in our habits of living and the greater consumption of ice cream, sweets, and beverages have been responsible for the enormous increase in the amount of sugar consumed.

Sugar—a gift from the East. Not many centuries ago sugar cane was unknown to the inhabitants of Europe. The few surviving Crusaders who returned from the Holy Land in the twelfth and thirteenth centuries brought plants back with them. Within two or three centuries it was being grown in many of the tropical European colonies. Now as then Spain and the island of Sicily are the chief cane-sugar producing areas in Europe.

Where sugar cane thrives. Sugar cane is a stout tropical or subtropical grass resembling corn. Under cultivation it grows to a height of twelve to fifteen feet. It thrives best in lowlands where the climate is hot and moist and entirely free from frosts. It also requires much sunshine and an abundance of water supplied either by rain or irrigation.

How sugar cane is grown. Sugar cane is seldom grown from seed—instead, stalks of the cane are laid in deep furrows and are

covered well. New shoots spring up from the *nodes*, or joints, of the buried stalks. Much cultivation is necessary until the growing plants shade the ground. Today many planters overcome this need by covering their fields with paper. The paper not only keeps out the weeds, but it also holds the moisture in the ground. It is easily pierced by the sharp young shoot of cane. The growing season is a long one. In Louisiana it is about eight months. In some tropical countries, such as Cuba, cane may be allowed to grow as long as eighteen months before harvesting, thus producing a higher sugar content.

If the cane is planted in regions of occasional frosts, not only is the sugar content lowered, but the fields must be replanted every year. As this replanting uses up from one sixth to one fourth of the crop, the yield of sugar is seriously affected. In the hot regions of Cuba, India, and Java where the roots are not harmed by frost, the cane will spring up from the old roots for five years or more. The yield, however, is better if every few years the fields are plowed up and planted anew.

Harvesting sugar cane. Until recently machines were not used in the harvesting of sugar cane. The stalks were cut by hand and the leaves and tops removed. Sometimes the fields are set on fire to remove the leaves and tops before cutting the stalks themselves. The growers learned this method by the accidental burning of a field of cane. On the larger and more up-to-date plantations machines are now used which, it is claimed, will do the work of two hundred laborers. As the yield of cane may be as high as sixty tons an acre, labor-saving devices can be counted on to do much to speed up the work of harvesting. Transportation of the cane to the mill is another stupendous task. The crop is not only heavy but bulky. In primitive regions it is carried by mule team or slow-going oxen. The more up-to-date plantations use trucks or railway lines. If railway lines are used, the tracks are moved from place to place as the harvesting progresses. A sugar mill in order to be run profitably must have at least five thousand acres of cane reasonably near at hand. Since the amount of sugar from each ton of cane is seldom more than two hundred forty pounds, one can readily see the advantage of having the mills near the plantations.

How the sugar mill works. First the cane is crushed and compressed, pressing out the juice which is evaporated in vacuum pans. Practically nothing is lost in the process. The production of sugar is of course the main object of the milling of the cane. Molasses is a



Courtesy Caterpillar Tractor Company

A field of sugar cane being harvested in Florida. Here wagonloads of cane are being drawn by tractors. Sometimes rails are laid in the fields and the cane drawn to the mill by steam trains.

valuable by-product. Even the pulp, known as *bagasse*, has a variety of uses. It may be used as fuel for running the mills or it may be mixed with molasses and used for feed for cattle. Large quantities are compressed into sheets for wall board. It is sometimes used in the manufacture of paper.

There are several grades of molasses produced in the milling process. The best grades are used as food for man. The lower grades from which nearly all the sugar has been removed are, as we have noted, mixed with the cane pulp or with alfalfa for cattle feed. Blackstrap, as this cheaper grade of molasses is called, also yields alcohol.

When sugar first comes from the mill, it is known as *raw sugar* and is of a brownish color and coarse-grained. In order to make it more palatable for table use, it is shipped to refineries which are usually located at the ports of the large consumer countries, such as the United States and Great Britain. Since sugar loses little weight in refining, it costs no more to transport the raw than the refined sugar. There are large refineries in or near Boston, New York, Philadelphia, Baltimore, New Orleans, and San Francisco. These

cities are close to the great markets for sugar, and skilled labor is readily obtained. Raw sugar produced outside our borders is brought to the refineries by ship and, after being refined, is sent to all parts of the country by rail.

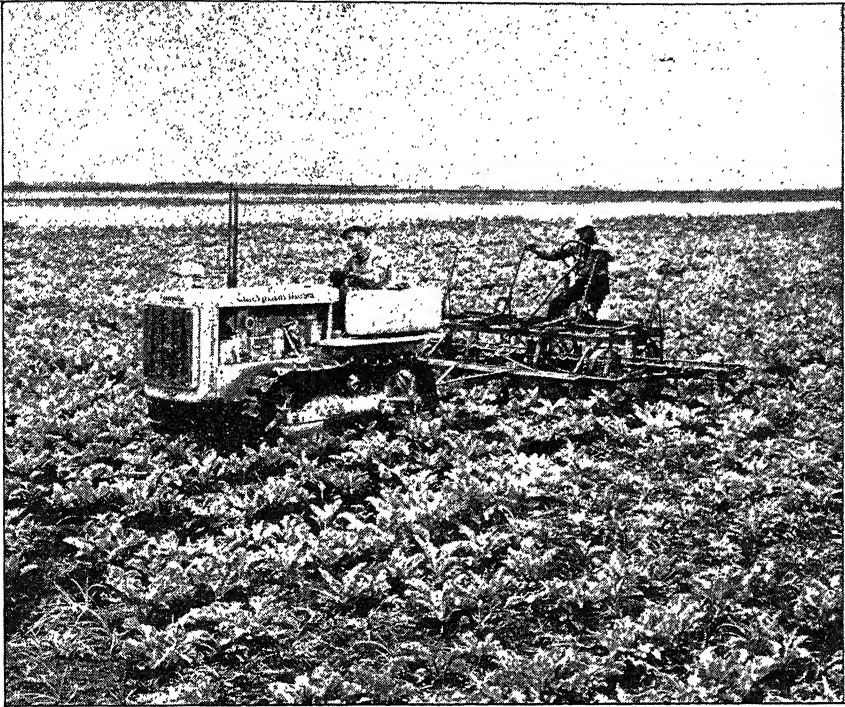
Lands where sugar cane grows. For many years Cuba led the world in sugar production. It has vast areas of rich soil and an almost ideal climate. There is ample rain for the growth of the cane followed by a dry season when the sugar is stored in the stalks. Only a small portion of the country suitable for growing sugar is now used for that purpose. Following the Spanish-American War, capital from the United States was invested in Cuban sugar lands to the extent of more than a billion dollars. Much of the raw sugar moves from Cuban mills to the refineries of the United States.

For a number of years India has led all other countries in the production of cane sugar. It is widely grown wherever the water supply is sufficient. It is raised on small farms and is wholly consumed within the country. Notwithstanding its large production, India was obliged to import sugar from Java. Java followed India and Cuba as a producer of cane sugar. Java could produce much larger crops, but the demand for food was so great that laws provided that sugar cane and other crops should not displace the rice fields. Java exported sugar not only to India, but to China and Japan and in smaller quantities to Europe and the United States. Other important cane-sugar producing regions include the possessions of the United States, Hawaii, the Philippines, and Puerto Rico. The production of Taiwan (Formosa), which belongs to Japan, is somewhat larger than that of Puerto Rico.

BEET SUGAR

The sugar beet. If it were not for the sugar beet, the people of temperate lands would be dependent upon tropical regions for their sugar. During the Napoleonic Wars, when France was unable to secure sugar from the West Indies, the French people turned to the beet as their source of sugar. Since that time the production of beet sugar has increased enormously.

For the success of the beet-sugar industry we are indebted to the German farmer and the German chemist. By careful selection the beets yield much more sugar than formerly; by improved methods of milling much more sugar is obtained from the same quantity of beets. Until recently our commercial growers imported seed from



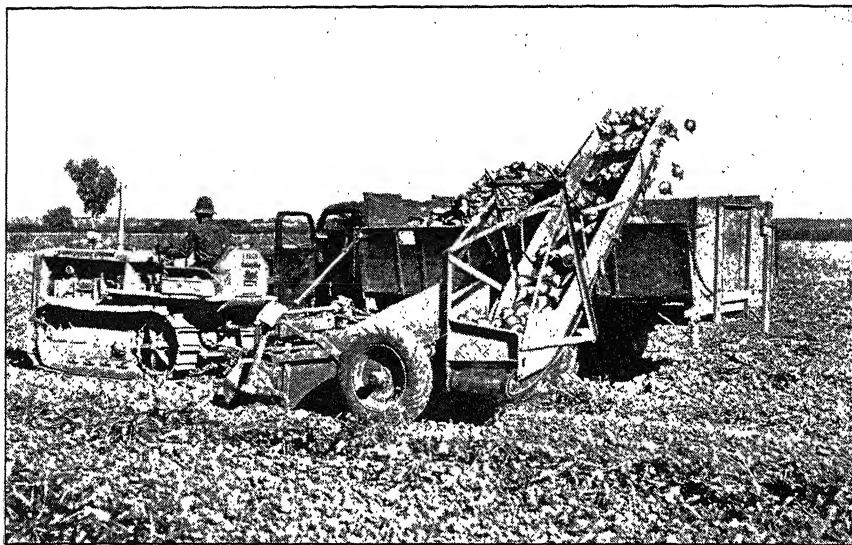
Courtesy Caterpillar Tractor Company

Cultivating a California field of more than three hundred acres of sugar beets with an eight-row cultivator

Europe. By careful breeding and selection varieties of sugar beets have been developed in the United States which resist disease. Therefore seed is now raised very largely in this country.

The sugar beet yields more than sugar. The production of beet sugar in temperate lands brings several advantages to the countries producing it. It makes the country more nearly independent for its sugar supply; it provides another farm product, another use for farm lands, and more work for farm labor. The pulp and tops supply feed for farm animals. Each acre of sugar beets in addition to the sugar that it yields may be made to produce by the use of pulp, tops, and molasses as animal feed three hundred pounds of meat in the form of beef, mutton, or pork. Moreover, the beet-sugar mills give the region another manufacturing industry.

Growing sugar beets. The climate best suited to sugar beets is one in which the summers are not too warm. Too much heat gives more fiber and less sugar. There should be a good supply of water in the early growing season and drier and cooler weather as harvesting time approaches. Much hand labor is needed. The young plants



Courtesy Caterpillar Tractor Company

Loading one ton of sugar beets per minute at a Colorado farm. The increased use of machinery is sure to lead to increased acreage and production of sugar beets. Formerly much back-breaking work was required.

must be thinned, and in the earlier stages of growth weeds too must be removed by hand. Much of this tiresome work is usually done by women and children. School vacations are often planned so that children will be free to work in the beet fields. Since beets require much cheap labor, they are often grown in rather thickly settled regions as in Germany, Czechoslovakia, and other countries of Europe.

A revolution in the beet field. Improved methods of handling beet seed promise a relief from the back-breaking work always connected with the growing of the sugar beet. Several years ago experiments were made by planting segmented seeds, that is, seed clusters were separated into individual seed or germs. The cutting was done in portable mills. When the separated seeds sprout, there are fewer plants to grow; hence less thinning to do. One grower says that this method cuts thinning labor in half. In the spring of 1943 it was estimated that 500,000 acres were planted to segmented seed. When the mechanical harvester, now being perfected, is put in operation the industry will be almost as completely mechanized as is the planting and harvesting of corn and wheat.

The beet goes to the mill. Cane sugar, as we have seen, goes as raw sugar from mills on the plantations to refineries near the consuming regions. Beet sugar, on the contrary, is milled and refined

in the same plant. The mills are near the fields, thus making it unnecessary to transport the heavy beets long distances. Furthermore, the by-products can best be used in country regions either in fresh condition or preserved in silos as cattle fodder. Colorado, California, Michigan, and Nebraska lead all other states of our country in beet-sugar production. There are about 100 beet sugar factories in operation in that section of the country.

Beet sugar areas. The United States produces more than three times as much sugar from beets as from cane. Louisiana and Florida are the only states in which sugar cane can be profitably grown. Even these small areas could probably not continue without the aid of a protective tariff. The areas adapted to sugar beets are much greater. These areas also enjoy the benefits of tariff, but, unlike the sugar-cane fields of the South, they suffer no disadvantage of climate as compared with other countries. Given a larger supply of cheap labor, we could doubtless produce much greater crops of sugar beets and consequently of beet sugar.

Our imports of sugar. The United States is the greatest consumer and importer of sugar. Of the 6,500,000 tons consumed, about one fourth is produced at home in the form of both cane and beet sugar; and in peacetimes one third to one half is brought in from our insular possessions, the Hawaiian Islands, Puerto Rico, and the Philippines; and the remainder is imported from foreign countries, mainly from Cuba. In recent years a quota was fixed for the quantity of sugar which could be brought into the United States, duty free, from Puerto Rico and the Philippines. By limiting the amount imported free of duty, a better market is offered for sugar produced in continental United States. Sugar coming into our country from Cuba pays a lower tariff than that imported from other foreign countries. Difficulties of transportation as a result of the war have greatly reduced our imports. This, plus the demand for making explosives and the needs of our allies, made it necessary to ration sugar in this country.

GUIDES TO STUDY

1. Why does sugar occupy so large a place in world agriculture and trade?
2. How is it that the people of the United States use more sugar per person than do the people of any other country?
3. At the time of the discovery of America sugar was considered a great luxury in European countries and was very expensive. Why was this so?
4. How do the conditions for growing sugar in Louisiana differ from those in Cuba?

5. Through what processes must cane sugar pass as it moves from field to market?
6. What advantages are there in producing sugar from beets as well as from cane?
7. Cane sugar is often refined far from the cane fields; beet-sugar refineries are near the fields. Explain.
8. How do the conditions and methods of beet-sugar production differ from those of cane-sugar production?
9. Why are beet-sugar mills and cane-sugar mills both near the fields of production?
10. How does a tariff aid the producer of sugar in the United States?
11. What advantage has each of the following sugar-producing regions: Hawaii? Puerto Rico? Cuba?

TOPICS FOR CLASS DISCUSSION

1. Why sugar was rationed.
2. By-products of the sugar mills.
3. The increased use of machines in the beet fields.
4. Segmented beet seeds.

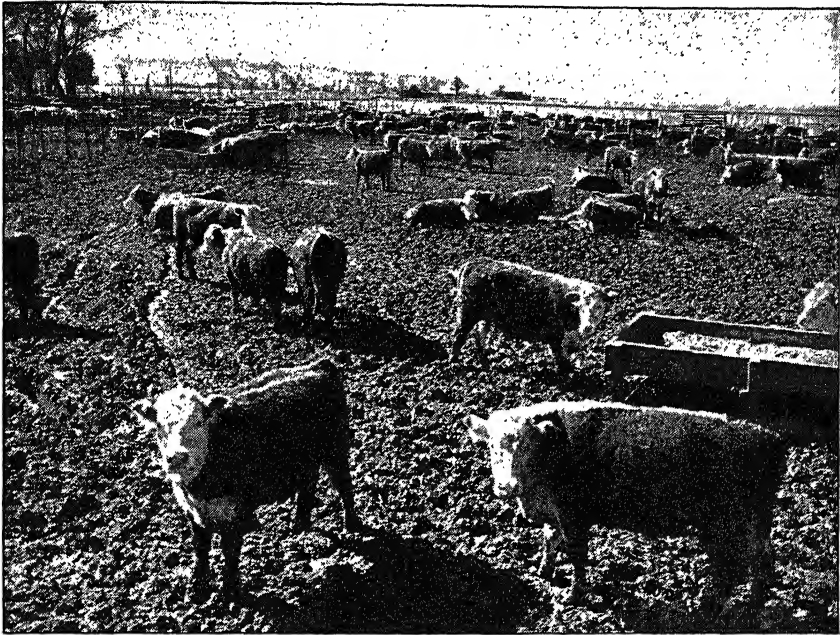
WORK TO BE DONE

1. Using encyclopedias or other reference books learn and report to the class on the history of sugar from the time of the Crusades to the present time.
2. On a map of the world locate the leading sugar-producing regions. Draw the chief routes from the producing countries to the importing countries. Locate the chief refining centers of the United States.
3. Make a list of the uses of sugar; a list of the uses of the by-products of sugar cane; a list of the uses of the by-products of the sugar beet. How does the use of these by-products affect the price of sugar?
4. Have different members of the class study and report on the methods of raising sugar in each of the leading producing regions. Why can some regions produce larger crops and at lower prices than others?

5. FOOD FROM DOMESTIC ANIMALS

MEATS AND DAIRY PRODUCTS

Beef supply in early days. Before people began to move into the great West, the meat and dairy industries were confined to the Atlantic States. There was plenty of room for good pasturage and for the raising of hay and grain for winter feeding. As the population grew, there was an increasing demand for beef and dairy products. Cattle raising was a profitable industry. When working



Courtesy Caterpillar Tractor Company

A few of the fine beef cattle raised on a ranch in Arizona. These cattle as a result of selective breeding are quite different from ranch cattle of the early days.

cattle or milch cows became too old for service, they were fattened and killed for beef. As the demand increased, young cattle were raised especially for beef and were fattened on the various farm crops. Of course this beef was not equal in quality to that which we get today.

Development of the beef industry. In early days cattle were slaughtered on the farms where they were raised or somewhere near by. The beef was sold in local markets since there were no railroads to carry it long distances to other markets. Gradually, however, the population of the eastern cities increased, and thousands of pioneers moved westward to open up the prairie states of Ohio, Indiana, and Illinois. Here on the rich plains was an ideal cattle country, and settlers were soon able to raise large herds of fine cattle. There was a great demand for beef in the East; but there were at first no railroads to carry it to the eastern markets. As a result, the cattle raisers had to drive their herds across country for long distances.

Before the railroads reached the Far West, great herds of cattle from Texas were still driven to the railroad terminals of the Middle West and there shipped to the East.

The cattle drive was an exciting but slow affair. Steers sometimes

got loose from the main herd and had to be chased and caught before the drive could be resumed. It took many men and horses to keep the cattle moving and to prevent losses. Sometimes there were even gunfights, when "cattle rustlers" tried to steal stray animals or to raid the large herds. The cow hands, or "cow-punchers," as they were sometimes called, had to be strong, fearless, and good horsemen. They were often quite violent in their language and conduct.

This overland cattle driving was very wasteful. Many animals died on the way, and those which reached their destination were so weakened and exhausted that they had to be rested and fattened before they were fit for use as beef. When the railroads were extended westward, large cattle cars were built, and the animals were loaded into them and carried to the eastern markets in a very short time. The days of the picturesque cattle drives were over. However, even cattle cars were not entirely successful, and many animals died on the long trip eastward, because the early freight trains were much slower than our present fast lines and the cattle often suffered from hunger, thirst, and crowding.

The last great improvement in the transportation of beef was the refrigerated car. This made it possible to kill the animals near the cattle ranches, to pack the meat into the cold cars, and to deliver it fresh to far-off markets.

Cattle raising. Cattle are raised both on farms and on ranches. On the farm there is usually good pasturage for summer grazing and crops of corn, hay, and alfalfa for winter forage. A ranch is devoted almost entirely to cattle raising. Our great ranches are mostly located in the regions of light rainfall on the Great Plains and in Texas and other parts of the Southwest. Here there is not enough moisture for general farming; but there are wild grasses of various kinds suitable for cattle grazing. While the cattle can live in these semiarid pasture lands, they do not grow fat on the wild-grass pasturage. Therefore, instead of trying to fatten their cattle for the market, many of these ranchers sell the young cattle to farmers in the Corn Belt. These animals are shipped to the farms, are fattened there on hay and grain, and then are sold for beef.

Corn is an especially good grain for fattening cattle and swine. Enormous crops of corn are raised in our Middle West; but most of it is fed to cattle and hogs. Corn does not keep well, and there would be no export market for our great crops if they were not converted into meat by being fed to animals. Thus the farmer gets a profit from his grain by selling it in the form of beef and pork.

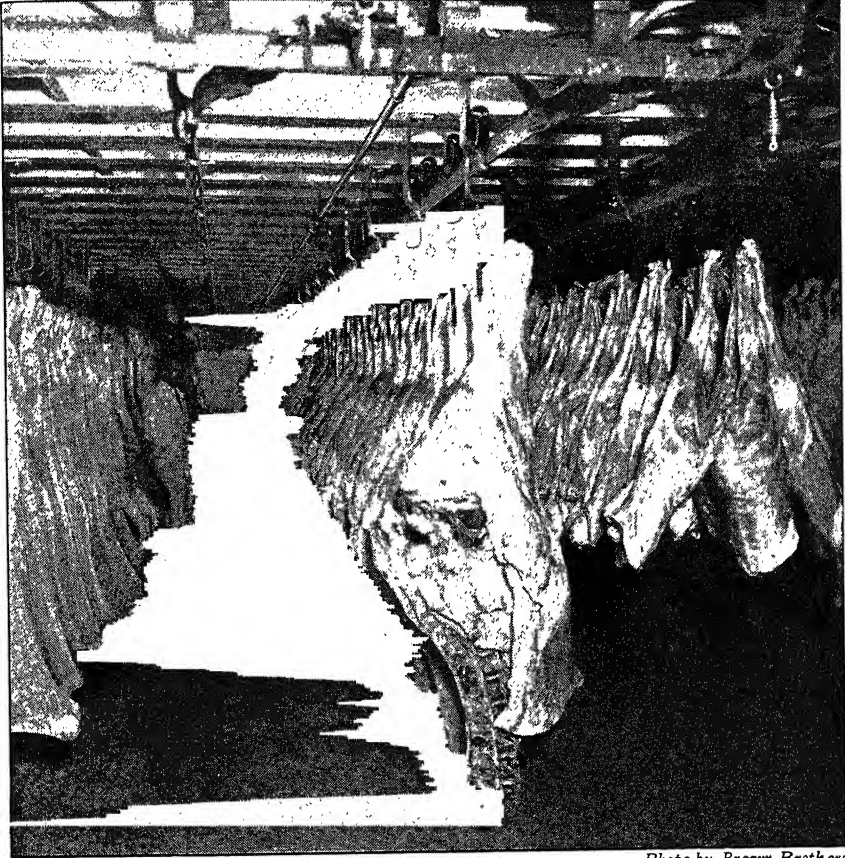


Photo by Brown Brothers

Interior of the refrigerator room of a meat-packing plant

The Corn Belt farms are an important factor in the production of meat and meat products for our tables.

Meat packing. The killing of the animals and the preparation of the meat for sale is called *meat packing*. This business usually ranks first or second among our manufacturing industries in the value of its products, and it employs more than one hundred thousand people in more than one thousand plants. The production of meat, lard, and by-products is now valued at about \$2,000,000,000 a year. Meat packing does not mean that all meat is packed in boxes, barrels, or other containers. Many meat products are so packed; but beef is handled differently. The animal is first killed and *dressed*; that is, it is skinned, cleaned, and certain parts removed. The carcass is then hung up, thoroughly chilled, and shipped out in that form. All this work is done with great speed and skill, and much machinery is

used. Some plants slaughter thousands of cattle every day besides sheep and hogs.

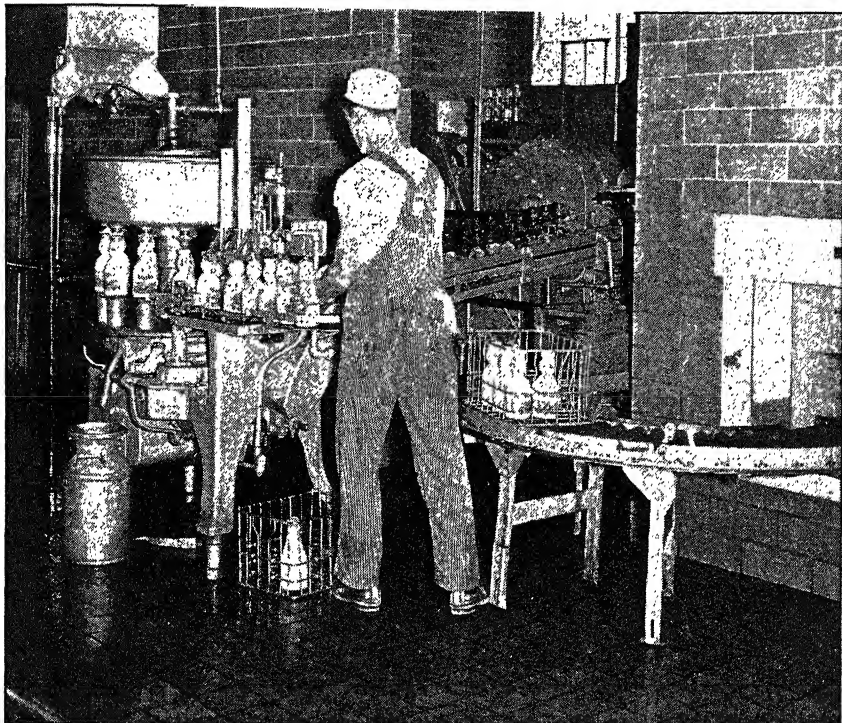
Besides fresh meats packing houses turn out many other products. Bacon, hams, and shoulders are smoked. Sausages and sausage meat and canned meats of various kinds are prepared. The large packing houses have cold-storage distributing centers in many large cities throughout the country. These warehouses keep the surrounding regions supplied with fresh meat at all seasons.

Packing houses also make a large number of by-products from the cattle that they kill. Fertilizers are made from bones, blood, and other waste materials. Glue is made from hoofs and bones; soap, margarine, and glycerine are made from fats; strings for tennis rackets and musical instruments from the intestines; and leather from the hides. Another important product of recent development is thyroid extract used in medicine. Nothing is allowed to go to waste; it has been said that in the slaughtering of hogs they use everything but the squeal.

Packing centers. Most of the great packing houses are located in the Middle West, in or near the Corn Belt. Can you see the reason for this? The leading meat-packing cities are Chicago, Omaha, Denver, Kansas City, East St. Louis, Fort Worth, Sioux City, South St. Joseph, South St. Paul, Cincinnati, and Indianapolis. These meat-packing cities are all railroad centers, which makes it easy for them to get their raw materials, the live animals, and to ship their finished products to all parts of the country.

THE DAIRYING INDUSTRY

Dairy products. Our milk comes almost entirely from cows although some goat's milk is used. Besides fresh milk our dairies produce condensed, evaporated, and powdered milk. When some of the water is evaporated from milk and sugar is added, we have *condensed milk*. When unsweetened, the product is called *evaporated milk*. When the water is entirely evaporated, we get *powdered milk*. Canned, condensed, and evaporated milk will keep for a long time, and they have become very popular as substitutes for fresh milk. For camping, cruising, and picnic trips canned milk is convenient and economical. In homes it is widely used for cooking and with tea and coffee. Powdered milk is an important ingredient in malted milk, baby foods, and prepared cocoas. The production of powdered milk has made it possible for us to supply our armed forces

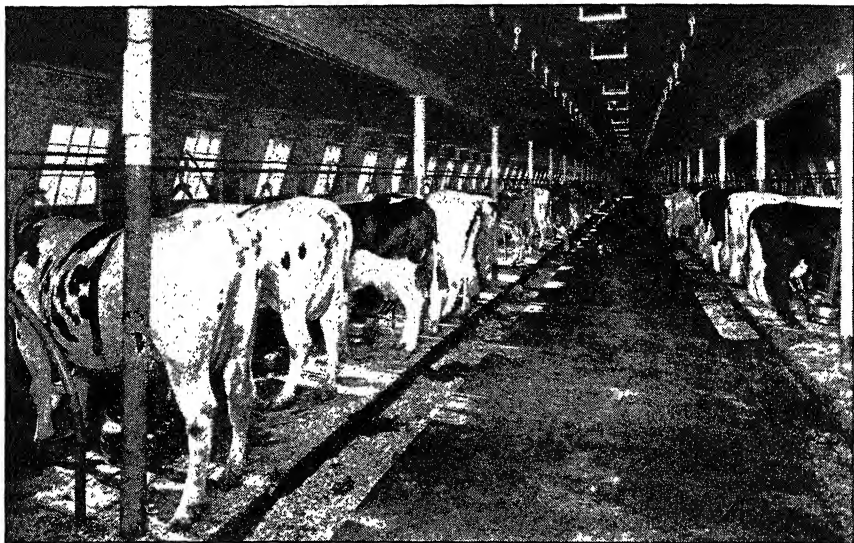


Courtesy Caterpillar Tractor Company

Bottling milk in an Iowa dairy. Most of the work is done by machinery.

and our allies with milk and milk products so necessary to the maintenance of a proper diet. Butter is made by churning the cream from fresh milk, and it is pure fat. Cheese is made from whole milk and contains both fat and protein. Pure cream is also sold for use with coffee and for whipped cream, ice cream, and other desserts. There are about 4500 ice-cream manufacturing plants in this country which require annually two and one half billion quarts of milk.

Milk production. The dairy business is one of our greatest industries with an annual production of about \$4,000,000,000. On 4,500,000 American farms 26,000,000 dairy cows produce annually 50,000,000,000 quarts of milk. Dairy cows are found practically all over our country. Even in the suburbs of large cities we frequently see scattered groups of cows grazing on vacant land. However, certain sections are better suited than others for milk production. Three conditions favor the development of good dairy cattle: a cool climate, good pasture and hay lands, and nearness to grain supplies. The best areas of this kind in our country are New England and the Middle Atlantic States, the region just north of the Corn Belt, and parts of

*Photo by James Sawders*

A modern Wisconsin cow barn. Notice that the cows are being milked by electrical milking machines.

the Pacific Coast. Among the leading milk-producing states are Wisconsin, Minnesota, New York, Iowa, and Illinois. More than fifty per cent of the dairy cows of the United States are found in the area north of the Ohio and Potomac Rivers and east of the Missouri River. This is due not only to the favorable climatic conditions but also to the fact that more than fifty per cent of the people of the United States live in the same area. To supply the dairy needs of so many people is an enormous undertaking.

The breeding of dairy cattle. Just as in the case of beef cattle, special attention has been given to the breeding of dairy cows. Some breeds produce milk rich in cream for buttermaking. Others give larger yields of milk which is not so rich in cream but is well suited for family use or for cheese. Among the finest breeds of butter-makers are Jerseys, Guernseys, Alderneys, and Ayrshires. For large milk production the favorite breed is the Holstein-Friesian. These are the large black and white cattle which are so often seen grazing in our pastures. All of these breeds convert their food into milk rather than into fat beef.

Dairying methods. Like the packing houses, modern dairies utilize machinery and skilled labor to improve and increase their production. Fresh milk is collected daily from the farms, placed in refrigerator cars, and rushed to the central dairy. Here it is graded,

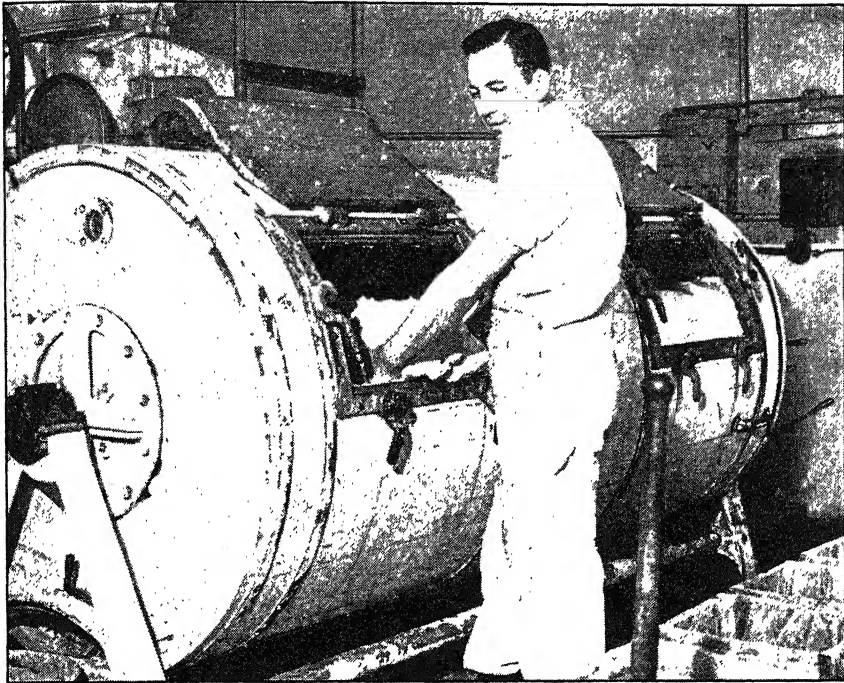


Photo from J. W. McManigal

A Kansas dairy. Taking the butter from the churn. Butter and cheeses of various kinds are among our rationed foods.

bottles, and pasteurized. Pasteurizing is done by heating the milk to a temperature of about 145° Fahrenheit for a period of thirty minutes. This is done to kill any disease germs which may be in the milk. The process gets its name from Louis Pasteur, the great French scientist, who discovered the fact that germs cause disease and suggested means to combat them. After the milk is cooled, it is delivered promptly to the stores and homes of the cities and towns in the vicinity. Health authorities enforce clean methods in the production and delivery of milk, and their efforts have greatly reduced the spread of certain diseases.

Butter is now made almost entirely by machinery. Power-driven separators remove the cream, which is then churned in another machine. Even the packing is done by machinery, and the result is a very high-grade, pure product.

In making cheese, the protein part of milk, known as *casein*, is coagulated, or made into curds. These are pressed into the desired shapes and allowed to ferment for weeks or even for months. Cheese is also packed by machinery. There are a great many different kinds

of cheese. They are all made from milk; the difference comes partly from the flavoring matter used, but chiefly from the different kinds of microorganisms used in the process of fermentation. The amount of water left in the curds also affects the quality of the cheese. Our greatest production is of American, or Cheddar, cheese; but in Wisconsin the people of Swiss descent make very fine Swiss, Limburger, and other types of foreign cheeses.

The dairy business has been greatly helped by the development of coöperative organizations of farmers similar to the fruit coöperatives of California. These coöperatives collect the milk, prepare it for sale, operate creameries, and see that the farmers get the best possible returns for their products.

FROM CORN TO PORK

Swine. While hogs are raised in all parts of the United States, more than half of our swine are found in the Corn Belt. This is because corn is an excellent fattening food for all animals and for swine in particular. The farmers of the Middle West raise far more corn than they can sell as grain or meal. But there is a large market for pork; therefore, the corn is fed to the hogs and a good profit is realized.

Iowa leads all other states in both corn and hog production. Other great pork-producing states are Illinois, Indiana, Ohio, Missouri, Minnesota, and Nebraska. In many other parts of the country hogs are fed on local crops, like the peanuts of the South and the acorns and other nuts of mountain regions. On farms hogs dispose of a large amount of waste materials, such as skim milk and discarded fruits and vegetables. They will eat almost anything.

Hog raising. The raising of hogs does not require so much labor or time as cattle raising. They are often turned loose in fields of clover or alfalfa and grow fat. They are even put into cornfields in the fall, where they do their own harvesting. They will clean out a field of almost any kind in a very short time. They have tremendous appetites, and therefore they grow very fast. It takes only about nine months for a hog to grow to full marketable size. Since it takes two or three years for a steer to reach a salable weight, many farmers prefer to raise hogs. Of course, the full-grown steer will equal several hogs in value; but the returns from porkers are quicker. In the Corn Belt there are more hogs than cattle; but in the country as a whole cattle exceed hogs in number.

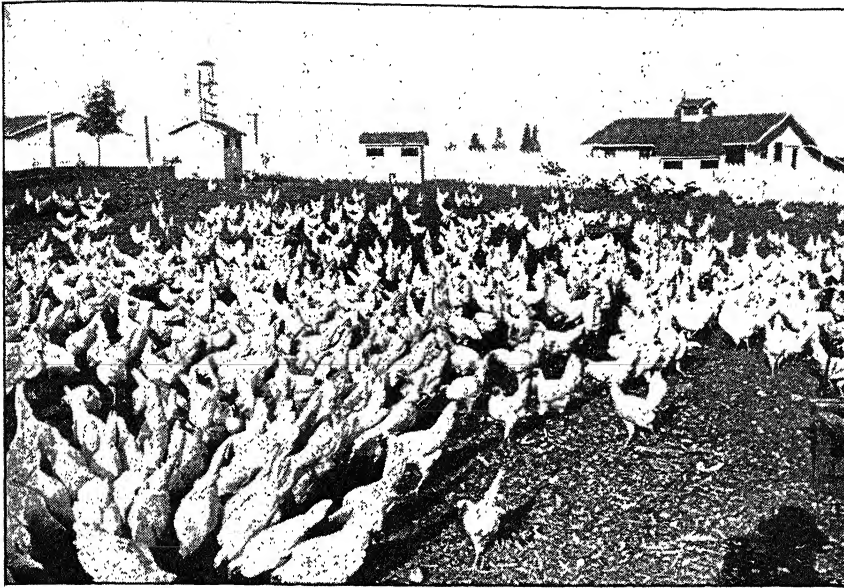


Photo from Keystone View Co.

A large chicken farm. These birds help to make the points of our ration cards last. Eggs and poultry require no coupons.

Hog products. The chief use of swine is for the production of pork in various forms. Hams, shoulders, loins, bacon, and lard are the most important of these; and they are prepared in the packing houses already described. Most pork is smoked, but a large amount of fresh pork is handled in the same manner as fresh beef.

There are also many by-products from hogs. Their bristles are used in brushes; their hides make a tough, strong leather; and practically every part of the animal is used. Even the feet and knucklebones are pickled and sold as a delicacy.

POULTRY AND EGGS

Fowls as food producers. The word *poultry* is usually applied to chickens, but it also includes turkeys, ducks, and geese, all of which are important food products.

Chickens, like cattle and sheep, are of two varieties. Some are bred to produce heavy, meaty birds; others to give a large egg yield. The ordinary farm usually raises a utility breed which is good for both meat and egg production. Breeds vary greatly in color and size, and there are a great many mixed types.

Poultry farming. Poultry farming has become a highly special-

ized industry. Hatching is done in large incubators, often heated by electricity. The baby chicks are either shipped to other farms or are cared for in heated brooders on the farms where they are hatched. Many thousands of day-old chicks are shipped by mail and express to all parts of the country and usually arrive in good condition. These baby chicks require no food for several days, living on the yolk of the eggs from which they were hatched.

Many young chickens are fattened rapidly and sold when about three months old as broilers. Chickens more than a year old are called *fowl* and are less tender than younger birds. An enormous number of chickens and fowl are used as food. Canned chicken soup is sold in great quantities. Eggs are also an important article of food, and their production and sale is a large industry.

The poultry business. The greatest poultry and egg production in the United States is in the North Central States, particularly Iowa, Illinois, Missouri, Kansas, Ohio, and Indiana. Texas, Pennsylvania, New York, and California are also great poultry states. But every section of the country abounds in poultry. Accurate figures are impossible to obtain; but it is estimated that there are in the United States more than five hundred million chickens, and that each year there are produced over two and one-half billion dozens of eggs. Turkeys, ducks, and geese are not nearly so numerous; but turkeys are becoming more and more popular, particularly during the fall and winter holiday seasons.

Among foreign countries one of the greatest poultry and egg producers is China. The Chinese were formerly the greatest exporters of eggs in the world. They specialized in reducing eggs to a powder and exporting them in this form. Our country has shipped millions of dried eggs to our allies and to our fighting forces.

GUIDES TO STUDY

1. Why may domestic animals be thought of as living factories?
2. What advantages are there in developing fine breeds of animals?
3. How do the methods of transporting meats and other animal products from the Western States to the East differ from those of a hundred years ago?
4. In what type of country is grazing carried on? Why?
5. How does the care of cattle in the Corn Belt differ from that on the Great Plains to the west?
6. How does the utilization of the by-products of the packing plants affect the price of meat? Why?
7. In what parts of the United States is dairying most important? Why?
8. Why is dairying important in densely settled countries?

9. Why does the Corn Belt farmer prefer to sell his corn in the form of beef or pork?
10. What kind of region is well adapted to sheep raising?
11. Why does the United States export less beef than formerly?
12. Why is the poultry industry more widely distributed than any other animal industry?

TOPICS FOR CLASS DISCUSSION

1. Domestic animals in colonial days. The first Thanksgiving.
2. The early cowboy and the cow towns. Riding the range.
3. Cattle and hogs on a Corn Belt farm.
4. The different ways of preserving meats.
5. The dairy farmer sells labor to a greater extent than the farmer who raises beef cattle.
6. Different ways in which milk goes to market.
7. Poultry makes our meat coupons go farther.

WORK TO BE DONE

1. Using encyclopedias or other reference books, learn from what part of the world each of our domestic animals came.
2. Make a list of the different breeds of cattle and sheep and find out the advantages of each to the rancher or farmer.
3. Consult the *World Almanac* and make bar graphs showing the number of cattle, sheep, and hogs in a few of the leading countries.
4. Assign to members of the class special reports on Life on a cattle ranch; Life on a Corn Belt farm; What takes place in the stockyards.
5. Trace milk from the farm (1) to the bottle of milk left on the doorstep in the city; (2) to cheese and butter in the dairy store of the town or city.
6. Learn all the ways in which coöperative societies aid the farmer or dairyman.

6. FOOD FROM THE SEA

FISHERIES OF THE UNITED STATES

Fisheries of the North Atlantic. The fishing industry off the northern coast is one of the most important of North America. Here lie the Newfoundland Banks and the Georges Banks. The fish taken on the banks live near the bottom of the sea and are known as *ground fish*. These include the cod, haddock, and halibut.

Ground fish. Many years ago these fish were caught from the decks of the fishing vessels by means of hand lines. Later the sailors went out from the vessel in small boats, called *dories*, and fished with hand lines. In still later times fish have been taken in much larger numbers by means of trawls. These consist of strong lines from a



Photo by James Sawders

A bucket of fish being lowered over the side of a fishing schooner. Boston is the greatest fishing port in the country. The more fish we eat, the more coupons we have for meats, butter, and cheese.

quarter mile to a mile in length. Short lines with baited hooks are attached to the long line five or six feet apart. Each end of the long line, or *trawl*, is supported by a floating keg. The trawl sags in the water until the baited hooks are near the bottom. Fish are taken from the trawl once or twice a day. As the fish are removed, fresh bait is placed on the hooks. The fish are taken to the vessel, split, cleaned, and salted. When the catch is completed, the vessel sails to a fishing port, such as Boston or Gloucester, where the fish are dried and prepared for market. Another type of trawl consists of a large net drawn along the bottom of the sea by a vessel propelled by steam.

Surface fish. Mackerel, herring, and bluefish swim near the surface in great numbers known as *schools*. These fish are caught by means of a *seine*, or net which is placed in the water in a vertical position. One end of the net remains in a fixed position while the other is drawn by a boat around the school. The net is gradually drawn closer and closed at the bottom to form a pocket thus taking hundreds of fish at a single haul. As the ship moves on, close watch

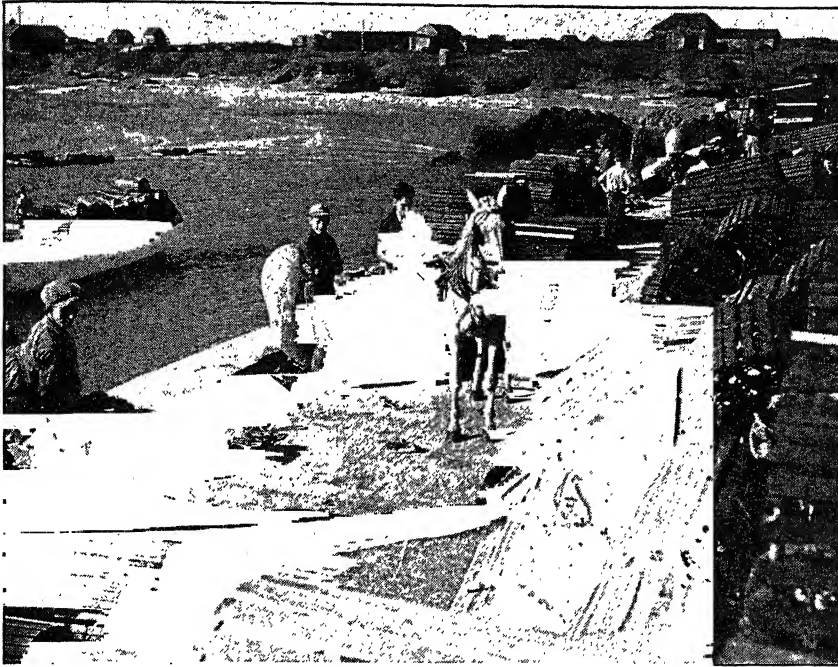


Photo from *Black Star*

The lobster season opens in New Brunswick. A piece of fish is placed inside the crate for bait; the crate is then anchored offshore in twenty or more feet of water. The lobsters enter through holes in the nets at the ends.

April to November. There they spawn and return south in the winter. Their winter habitation is unknown.

Shellfish. Lobsters are caught in baited traps, or *pots*, along the shores of New England and Canada. The trap rests on the bottom and is located by means of a wooden or cork float. Continued fishing has greatly reduced the supply. Old men living on the coast tell of days when it was possible with a pole to pry out from crevices beneath the rocks in a brief time all the lobsters needed for home use. Now they are found only in deeper water and caught only by means of traps.

Oysters and clams abound along the Atlantic and Gulf Coasts. Clams are dug from the sand or mud on our beaches, or *flats*. Oysters cannot live in sand or mud but are found along the shores in clear shallow water where they attach themselves when young to empty shells or other solid bodies. They are found from Cape Cod southward along the Atlantic and Gulf shores with Chesapeake Bay the leading center of the industry. Oyster beds are generally leased by individuals or companies from the government owning the shores.

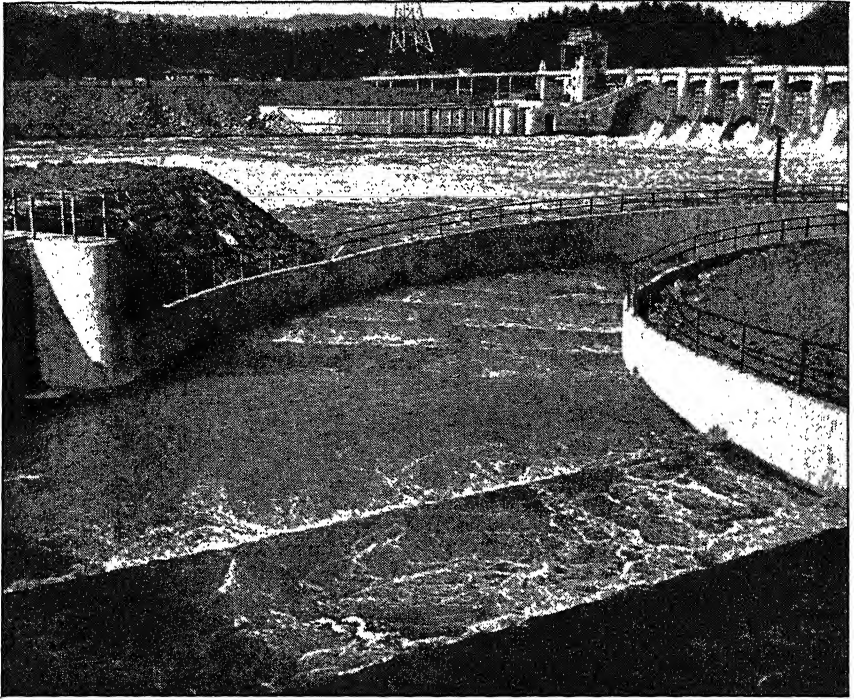


Photo by James Sawders

Fish ladder at Bonneville dam designed to allow the salmon from the sea to reach their spawning grounds in the river where they were born

Empty shells or other *cultch* is scattered over the bottom to which the young oysters attach themselves for the remainder of their lives. Oysters are gathered by means of rakes or tongs. They are shipped in the shell or cut out and packed in jars or other containers and by means of refrigeration are shipped as fresh oysters to all parts of the country. Others are cut from the shells, canned, and sent to market.

Fisheries of the South Atlantic and Gulf Coasts. Fish are not so abundant in the South as they are in the cooler waters of the North, yet the South has its advantages. Less frequent storms and warmer temperatures render the fisherman's life less dangerous and less rigorous. Cape Hatteras is the southern limit for the cod and mackerel of northern waters. In the southern waters are found the shrimp, bluefish, shad, Spanish mackerel, and oyster. Scallop fishing is important off the shores of North Carolina. The most valuable product of the Gulf Coast is the oyster. Other fish are the shrimp, red snapper, mullet, Spanish mackerel, and sea trout. Much crab meat is canned and shipped to all parts of the country. In the South-

ern States alligators are killed for their hides. Sea turtles are sought by fishermen of all the Gulf States. Some of the larger species weigh more than half a ton.

Sponge fisheries. Sponges grow near the reefs of Florida and the adjacent islands. Some of the sponges are hooked from the floor of the sea with the aid of a long pole. The sponges are sighted with the aid of a bucket having a glass bottom. Others are obtained by diving. By this method the sponges can be secured from greater depths and in better condition.

Fisheries of the Pacific Coast. Fish in Pacific waters of the United States include the salmon, the tuna, and the halibut. By far the most important fish taken from the rivers of Washington, Oregon, and Alaska is the salmon. These fish after years spent in the ocean return to the rivers in which they were hatched. The fish swim up the rivers—jumping falls if not too high—to their spawning grounds. The great Bonneville Dam on the Columbia River not far from Portland provides a ladder which enables the fish to ascend the river. If this ladder were not present, the fish would be unable to reach their spawning ground and there would be great loss to the salmon industry.

Salmon are caught by means of nets of various kinds. Some of the nets are drawn in by horses over shallow sand bars. The greater part of the catch is canned. The salmon have been caught in such large numbers that laws have been passed to protect them, and fish hatcheries supply millions of young fish to the rivers each year. The fish hatchery protects the young fish from their enemies until they are better able to care for themselves. The value of the salmon canned from the rivers of the coast is valued at above five million dollars per year when the run is high. The Alaska pack is several times as great.

Fishing for sport. Many a tired office worker leans back in his chair and dreams of boyhood fishing days. Soon the dream gets the better of him, and with rod, reel, and high boots he seeks lake or stream for a week or two of sport. Fishing for sport may be fun for the sportsmen, but it is a real business for men who guide the fishermen, cook their food, paddle their canoes, and pitch their tents. It is also real business for railroads which carry thousands of sportsmen from city to lake and forest and home again. State and Federal Governments stock streams and lakes with trout and other fish that the fisherman may not be disappointed when he comes. Wardens have authority to see that all laws relating to fishing are



Photo from Triangle Photo Service

Fishing in the Nipigon River, Canada. Fishing and hunting add much to Canada's income. Sportsmen from the United States visit Canada in large numbers. Sportsmen add to the prosperity of Canadian hotels and railroads and give employment to Canadian guides.

obeyed. Much advertising is done to inform and to tempt men to leave their work and spend their money in one region or another. Fishing for sport brings good returns both to those who catch the fish and to those who labor for the fisherman's success.

Fishing for whales. Whale fishing probably began when the Northmen sent out vessels in search of whales more than a thousand years ago. Since that time fishermen of many countries have sought the animal for its oil and whalebone. Among the leaders in the industry in the past were the British, the Dutch, the French, the Spanish, and the Norwegians. During the last century the United States was among the foremost countries in whale fishing. New Bedford, Massachusetts, was the greatest whaling port of the world. Before Norway's occupation by the Germans the Norwegians had almost a complete monopoly. Their ships scoured the northern seas and the borders of Antarctica. A hundred Norwegian ships with 8000 men hunted for whales in Antarctic waters.

The chief product of the whale is oil. Before the days of petro-

leather, for lubrication, and for making soap. In some countries refined whale oil is used in making lard and butter substitutes. Other products of the industry are whalebone, glue, and fertilizer. Whale meat is eaten in Japan and to a limited extent in Norway. In New Zealand it is canned.

GUIDES TO STUDY

1. What are ground fish and how are they caught?
2. Describe the manner in which surface fish are caught.
3. Where are the chief grounds for catching shellfish and what are the methods used?
4. What kinds of fishing are carried on along the South Atlantic and Gulf coasts?
5. Who benefits from fishing done by sportsmen?
6. What are the products of the whale fisheries?
7. What are fish ladders and why must they be provided?

TOPICS FOR CLASS DISCUSSION

1. How the fishing industry is protected by government regulations.
2. Purposes of Japanese fishing in American waters.
3. By-products of the fishing industry.
4. What other occupations depend upon or are stimulated by the fishing industry?

WORK TO BE DONE

1. Plan an exhibit of materials used in the fishing industry, including small models of ships, trawls, and nets. Add pictures showing how fish are caught in different parts of the world.
2. Appoint a committee to report to the class on the way in which fish are preserved so that they may be sent to distant markets. What are the different methods of refrigeration?
3. Make a list of the different kinds of fish and fish products sold in the fish markets and grocery stores in your vicinity.
4. Learn how the early methods of whaling differed from those of the present time.
5. Write the life story of the salmon.
6. Learn all you can about sponges.

UNIT XI. CONSERVATION—PAYING A DEBT TO FUTURE GENERATIONS



Courtesy United States Forest Service

These men are "smoke jumpers." Their plane carries them to the place where a forest fire has been sighted. They wear heavy padded suits and wire masks for protection in parachute landings in dense forest growths.

HUSBANDING OUR RESOURCES

Resources are expendable. We owe much to past generations.

"All the good the past has had
Remains to make our own time glad."

We cannot repay past generations, but we can do much to make life better for the generations to come. We would not care to be like the homeowner whose house was surrounded by beautiful shade trees which his grandfather had planted. A neighbor said to him, "You are very fortunate in having so many fine trees. There is still room, why don't you plant some?" The homeowner who was no longer a young man replied, "What good would they ever do me?" So the conservation of our resources may not add to our own welfare, yet it means much to the generations that follow us.

Our forests are being cut much faster than trees are growing. Our farm lands are all in use; there are no new areas to be cultivated.

Oil and coal have been used with little regard to future needs. Upon our resources and upon the well-being of our citizens depend our great industries and the comforts of our homes. Besides caring for our soil resources we should give very careful attention to our forests and mineral resources, especially petroleum, coal, and iron.

CONSERVATION OF FORESTS—A VITAL NEED

Lumber for the future. The people of the United States are destroying their forests four times as fast as they are being replaced by growth. Where is our lumber supply of the future to come from? There are at least two ways in which our future supply of lumber can be assured. One is to stop the tremendous waste of forests and lumber. The other is to keep the forest lands working by growing new trees for future use.

Preventing forest fires. Let us first see how waste can be stopped. The greatest enemy of the forest is the forest fire. Each year forest fires sweep over areas as large as the states of New Hampshire and Vermont. This great waste can be almost wholly prevented if sufficient attention is given to safeguarding the forests from fires. Many fires are due to sparks from locomotives and lumber mills and to the carelessness of hunters, trappers, picnickers, and brush burners. Most of these can be prevented if proper care is exercised. The Federal and State Governments attempt to prevent fires and to check them as soon as possible when they have started. Watchtowers are scattered over forest areas, and, as soon as a fire is detected, warnings are sent to stations prepared to fight the fires with men and equipment. In dry seasons hunters and pleasure seekers are forbidden to enter the forests. The burning of forest waste should be done after a heavy rain or a fall of snow when the danger of a conflagration is much less.

Preventing waste. Another way of conserving our forests is the prevention of waste in lumbering and in preparing the lumber for use. Formerly much of the waste material was burned. Now some is used for fuel and some in making small articles, such as laths, handles for tools, and toys. Waste pieces of wood are ground up and made into composition boards for partitions. Other wood not used for lumber is made into charcoal or distilled for wood alcohol. The amount of sawdust has been lessened by the use of thinner saws. Mixed with other substances, sawdust is used to some extent as feed for cattle. In the Northwest it is used for fuel.

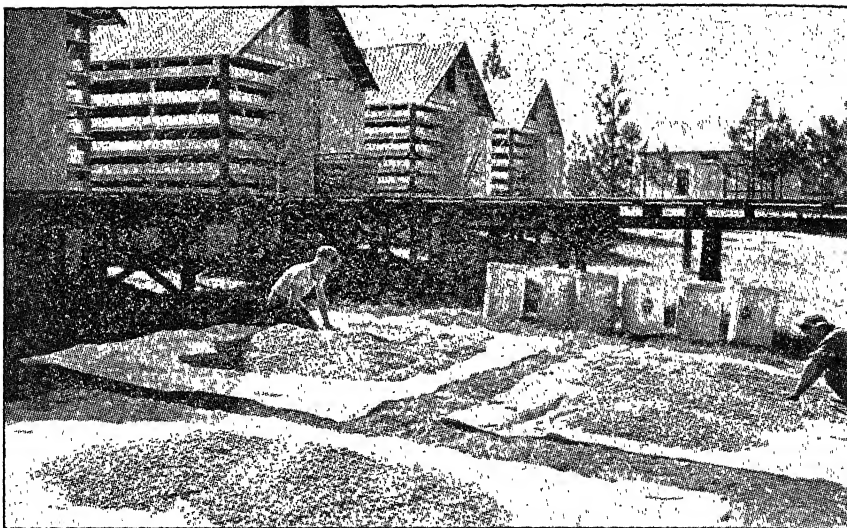


Photo from U. S. Forest Service

Spreading tree seeds on tarpaulins to dry in the sun. Eventually they will be planted in a nursery.

Using preservatives. More attention than ever before is being given to the treatment of lumber with chemicals to prevent decay and destruction by insects. The wood treated is chiefly that used for railroad ties, bridges, piling for wharves, foundations for buildings, and telephone and telegraph poles. Such treatment with creosote or other chemicals adds years to the lasting quality of the wood.

Caring for forest lands. The second method of providing for the future is to keep forest lands busy growing trees for the future. Formerly lumber companies stripped the land of its trees and then abandoned it. More and more, lumber companies, the owners of paper mills, and operators of other wood-using industries are providing for their future needs by caring for cutover lands and by planting trees, or *reforestation*. Many of the states have foresters whose duty it is to have general oversight of the forests within the state and to encourage the protection and conservation of forests in every way possible. The trees are protected from insects and diseases which do much damage to them. More than thirty states now have forest nurseries that distribute young trees to citizens for planting.

Using substitutes. As the price of wood and lumber increases, search is constantly made to find substitutes. Buildings have long been constructed of brick and stone. In recent years concrete, artifi-

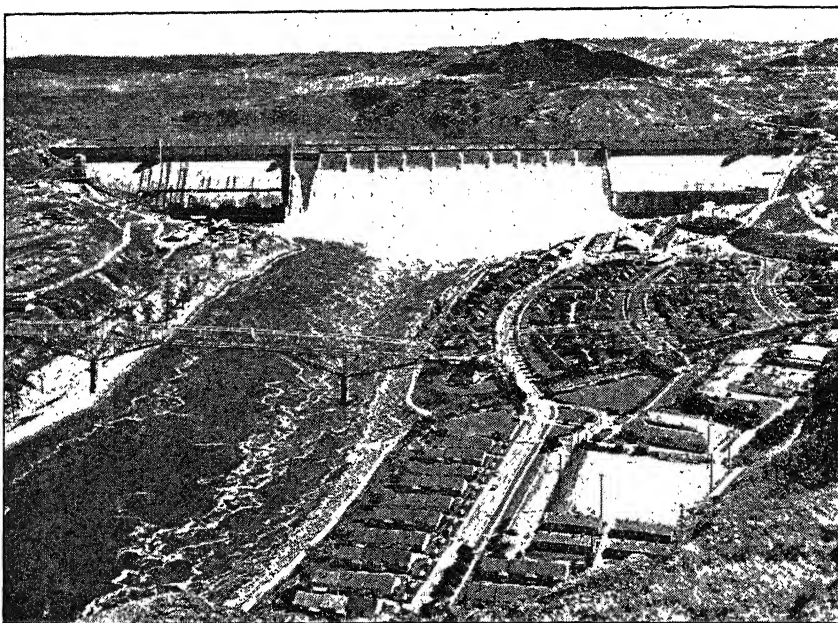
buildings. Even laths may be of metal, and shingles may contain large proportions of asbestos or asphalt, or they may be of slate, metal, or tile. Wire in various forms is widely used in place of wood for fences. You have already seen in your study of containers that paper, cardboard, and cloth have to a considerable extent taken the place of wood.

National forests. The main purpose of National forests is to point the way in providing for our future needs of lumber. They were first established in 1901. The President of the United States was given authority to place under the control of the National Government portions of the public land for growing timber. From time to time this has been done and our National forests now cover more than one hundred sixty million acres, an area nearly as large as Texas. A National forest does not mean a forest area on which trees are not to be cut. When a part of a National forest is ready for cutting, the standing timber is sold to the highest bidder. The lumbering is done under the supervision of Government foresters. Each forest is so managed that cutover lands are constantly providing a new growth of trees. Every effort is made to prevent fires. Every National forest is an object lesson in the scientific care of trees and land.

CONSERVING OUR WATER POWER

Rivers—servants or masters? From earliest times rivers have been one of man's greatest helpers. They have served as highways; they have watered fields and have given him power for mills and factories. On the other hand as rushing torrents they have overflowed farm lands, destroyed crops, animals, and homes, and taken many human lives. One of our great problems is to keep our rivers within bounds, compel them to do our work, and prevent them from doing harm. In the past hydroelectric plants as a rule have been constructed by private capital. In recent years the Federal Government has entered the field and has undertaken the building of some of the world's largest power plants. We can study only a few of the recent government projects for harnessing our rivers.

Grand Coulee Dam. A giant undertaking of the Bureau of Reclamation was the construction of the Grand Coulee Dam across the Columbia River about ninety miles from Spokane, Washington. This power plant is the largest source of electric energy in the world and furnishes more than six times as many kilowatts as did the



Courtesy United States Bureau of Reclamation

The Grand Coulee Dam near Spokane, Washington, takes its name from a deep canyon in the Columbia Plateau not far from the site of the dam. The river once flowed through this canyon.

great Dnieper plant of Russia. The reservoir formed by the dam is the largest artificial lake in the world and raises the level of the river even at the Canadian border. The electricity generated is used in part to pump water 280 feet from the river to an old canyon dug by the Columbia River thousands of years ago when the river was turned from its course by a glacier. The water stored in the old canyon will be used for irrigation. Only one tenth of the great volume of the river will be used for irrigation purposes; another tenth gives the power to raise the water to the upper lake. The land to be irrigated is about equal to the area of the state of Connecticut and when developed should support a population of about 350,000. Many war industries have been located near this project.

Boulder Dam project. The Boulder Dam project is probably the largest irrigation project in the world. The dam is built across the Colorado River at Black Canyon on the boundary line of Arizona and Nevada. The Colorado is America's most dangerous stream. Along many miles of its course it flows through canyons in places a mile in depth. The course of the river can be followed along the canyon floor only at great risk. Men have lost their lives in attempts to explore the path of the river as it rushes madly between towering

walls of rock. Below the canyons in times of flood the river breaks through its banks and floods farm lands for miles around.

Taming the river. Boulder Dam is an attempt to bring the river under control, to check its mad rush in time of flood, and to make use of its tremendous power which for centuries has gone to waste. Floods cannot now pass the 727-foot dam, the highest in the world. Instead the water is held back to form a lake 115 miles long. Power houses at the base of the dam generate electricity to light streets and homes and turn factory wheels in cities 250 miles away. It supplies about half the power used in southern California. The lake supplies vast quantities of water to irrigate lands in several states, the most important areas lying in and near the Imperial Valley of southern California. A group of thirteen cities united to construct an aqueduct 250 miles long from Parker Dam 150 miles below Boulder Dam to Los Angeles and neighboring cities.

Irrigation water for the Imperial Valley passes through an 80 mile All-American Canal from Imperial Dam near the Mexican border to the Imperial Valley. In the past water for the Valley followed a canal running for many miles through Mexican territory before reaching the American farm land. A branch canal will extend to the Coachella Valley lying to the north of the Imperial Valley.

The great lake above Boulder Dam is known as Lake Mead. This calm lake presents quite a different picture from the tumbling waters as they rushed through the canyon before the dam was built. The lake has already become a great recreational center. Nearly half a million people come here each year to view the wonderful dam and the great lake. The lake has been stocked with fish and this offers an additional attraction to those who fish for sport. Truly the Colorado River has been tamed.

Development of the Tennessee Valley. No project either public or private ever aroused the interest of all the people of the country as did that begun in the Tennessee Valley in 1933.

During World War I the United States needed large quantities of nitrates to make explosives. Like all other countries it had depended on Chile for a large part of this supply. To make itself less dependent, the Government built a large electric-power plant at Muscle Shoals on the Tennessee River in Alabama. Nitrogen compounds were to be made from the nitrogen of the air by the use of electric power. Before the plant was finished, the war came to an end. The plant lay idle for years. Congress could not decide whether to sell it or to make use of it under Government control. To

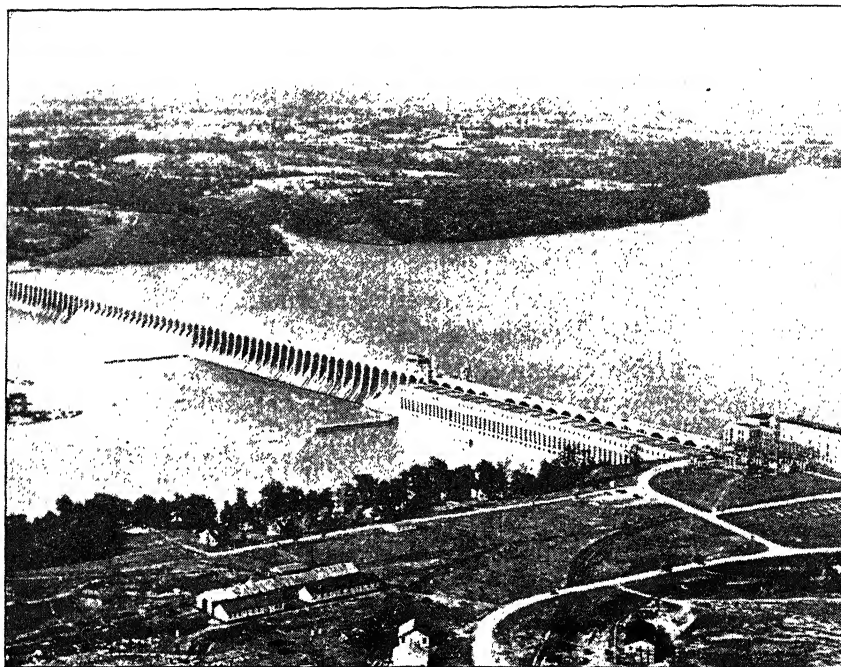
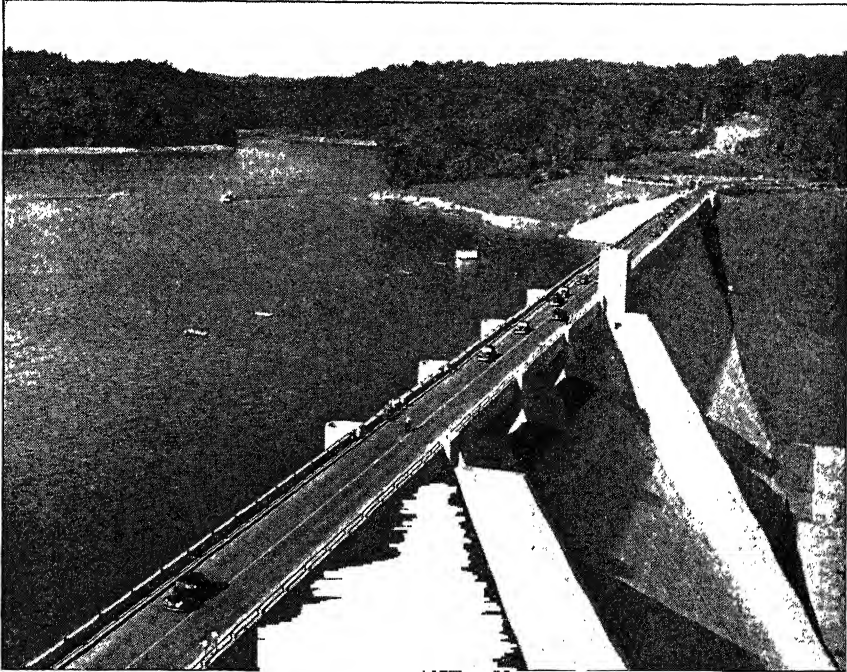


Photo by James Sawders

Wilson Dam at Muscle Shoals, Alabama. This is the main dam of the Tennessee Valley Development. Note how the dam raises the level of the water up-river and thus aids navigation. The chief purpose of the dam of course is to produce hydro-electric power.

settle this problem and to further other plans of the Federal Government, the Tennessee Valley Authority, commonly referred to as the TVA, was established. Let us see what the TVA has accomplished in this great area drained by the Tennessee River, an area equal to that of the state of Ohio. It provides the region with abundant electric power at low rates. This abundant and cheap power is used in the sparsely settled countryside as well as in the cities and towns of the region. The rates are so low that the farmer can use the power to saw wood, churn butter, pump water, heat the incubator for hatching eggs, and do many other farm chores. In the home electricity furnishes light, heats the flatiron, runs the washing machine, the vacuum cleaner, the dishwasher, and the refrigerator just as it has long done in the city home. All these devices help to make farm life easier both out of doors and in the house.

Ten multiple-purpose dams have been completed. Among the most widely known are the Wilson Dam at Muscles Shoals and the Norris Dam on the Clinch River, a branch of the Tennessee. The latter is chiefly a storage dam.

*Photo by James Sawders*

Norris Dam showing the motor highway which crosses it and Lake Norris formed by damming the Clinch River

The dams mentioned and several others help to raise the level of the water in the river so that the Tennessee is made navigable nearly its entire length. The dams also check the flow of water and thus help to prevent floods in the valley in time of heavy rainfall. Other dams are being rushed to completion to furnish power for war industries, especially the manufacture of munitions.

Another purpose of the TVA is to prevent erosion of the soil. Since this is a hilly country, there has been much soil erosion and farm lands have often been ruined. The farmers are urged to plant certain crops, to terrace hillsides, and to dam gullies so that erosion will be lessened as much as possible. Soil erosion not only removes the very best soil, but the silt carried by streams and rivers fills river channels and storage basins. In this way transportation is hindered, and the basins cannot hold so much water for power.

Another aim of the TVA is to make use of electric power to provide fertilizer for the farmers. Phosphate rock, a basis for fertilizer, is found in the valley. Chemists are trying to find the best methods of changing the crude rock into useful fertilizer. In brief the Au-

thority intends to bring prosperity to the people of the Tennessee Valley through a wise use of the natural resources.

CONSERVING OUR MINERALS

A robber industry. When forests are destroyed by the lumberman or by fire, the trees may grow again if seedlings are planted or if the forest area is properly cared for. Unlike the forests minerals once used can never be replaced. Mining has been well called a *robber industry*. Man takes nature's savings of past ages from the earth and never returns them. Even though mineral deposits cannot be restored, much can be done to make our supplies last as long as possible.

Saving petroleum. No one knows how long the world's petroleum supplies will last. It is not easy to estimate the underground stores. All experts are agreed, however, that with the rapid increase in consumption it will not begin to last so long as coal. The length of time it will last is probably a matter of decades rather than centuries. What then can be done to save as much as possible of this supply for future use? A great deal of waste takes place in the oil fields. More oil is taken from the earth than is really needed. Each owner is eager to turn his oil into cash. Owners fear that, if they do not drain the oil from their own wells, it may flow into the wells of other owners near by.

When the market is glutted with oil and the price is reduced, wells which yield only small quantities are shut down and the oil remaining in the earth can never be used. By taking from the ground only what oil is needed for the present will help to meet future demands.

The oil supply of the future will be greater as experts learn better ways of finding deposits below the surface. In the early days of the industry the "hit or miss" method was used. A well was drilled and, if oil was found, the owner was lucky. Now geologists study regions with great care and give close attention to the kind of rock through which the drills pass. With the help of experts oil deposits are much more readily located. Oil is also saved if the owners of wells in a region agree to draw the oil slowly and maintain the pressure in all the wells. Oil will then flow for a much longer time. If this is not done, much oil remains in the earth and is lost.

Methods of refining also offer opportunities for saving our oil supplies. Gasoline is the one product of petroleum for which there is

the greatest demand. Refiners are constantly seeking methods of obtaining more gasoline from a given amount of crude oil. One method known as the *cracking process* yields twice as much gasoline as the older methods. By the introduction of free hydrogen an even larger proportion of gasoline is obtained. Refining methods of the future will no doubt enable refiners to obtain larger proportions of the more useful by-products from crude petroleum.

As oil wells become exhausted, we shall be obliged to look elsewhere for sources of liquid fuel. Rocks known as *oil shale* of which the United States and the rest of the world have large resources contain much oil. These rocks when subjected to varying degrees of heat yield the various products now derived from liquid petroleum. Such products, however, are not so cheap as when obtained directly from crude oil. German chemists have shown that gasoline can be obtained from coal and lignite, or brown coal. Very small quantities are obtained from coal in the United States but at present this is done only in an experimental way.

Conserving coal. No doubt our reserves of coal are much greater than those of oil. We do not as yet feel so much concern for our future supply of coal. Yet we must keep in mind the fact that the supply is limited and that there is no way of replacing it. Coal can be saved by more careful methods of mining. Props of wood are used in place of great pillars of coal once left to support the mine roof. Thin layers of coal have been left in the ground because it was not so profitable to work them as thicker layers. When more thought is given to future supplies, mining methods will be more efficient than they are today. Fortunately not so much coal is being used as in former years. Modern locomotives use less coal than older types. Iron is smelted and steel made with less coal than formerly. The electricity which comes into our homes and lights our streets if generated with steam has required the use of less coal than was necessary twenty years ago. Furthermore, more and more electricity used for light and power is being generated by water power. This is a great saving of coal. Water power is not consumed; the supply is never exhausted. One of the best ways of saving coal is to harness as many rivers as possible.

Iron for the future. We cannot live in an iron age without using vast quantities of iron. This metal differs from coal and oil because it can be used more than once. Iron once used when broken up to be remelted is known as *junk*. Old bridges, locomotives, steel ships, automobiles, and many other iron products yield large quantities of



Photo by James Sawders

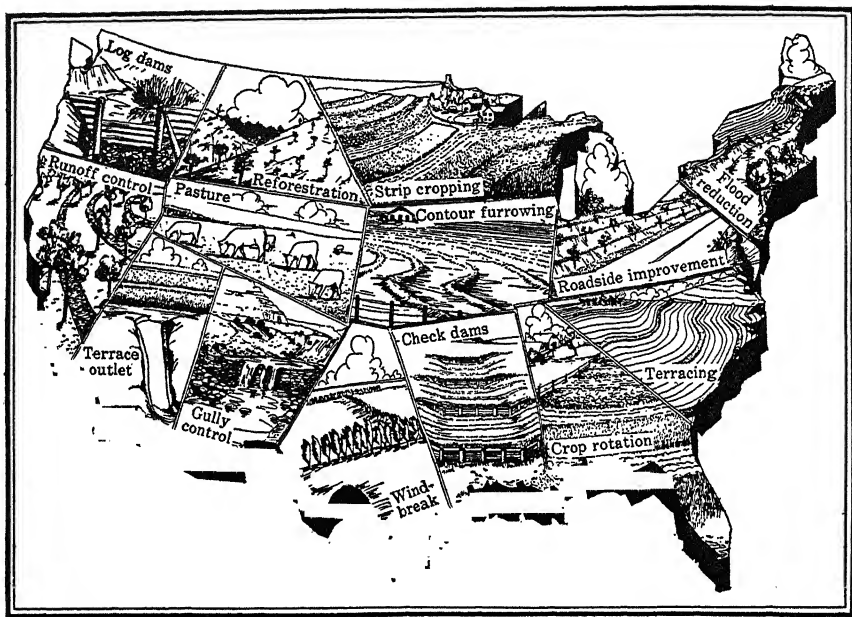
Save the scrap. Why is the United States flag flying in the center of the heap of junk? What materials in a pile like this can be put to use?

iron to be used again. The junkman by gathering up iron waste helps to make our supply of iron last longer. Besides the thousands of tons of old iron used in our country in the manufacture of steel, we unfortunately exported scrap iron by the shipload to Italy, Japan, and other countries whose iron deposits did not provide enough for their needs. After war broke out, we had to have scrap-iron drives to replenish our own supply.

Not all iron can be saved for repeated use. Rust, the great enemy of iron, is ever at work. For that reason iron and steel are preserved with coats of paint or thin layers of zinc giving what is known as *galvanized iron*. Stainless or rustless steel is made by combining with the iron small quantities of chromium and other metals. The prevention of rust seems to be the best means of conserving our supplies of iron and steel.

CONSERVING THE SOIL

Wind erosion. Low prices and poor markets are not the farmer's only problems. He must prevent wind and water from carrying off the soil upon which the value of his farm depends. Wherever the



Courtesy U. S. Department of Agriculture

Various methods of saving soil from erosion

wind blows, soil is being blown away; wherever rain falls, soil is being washed down the slopes and off the farm. On the High Plains east of the Rocky Mountains great dust storms occur. Fences become buried in dust, drivers of automobiles cannot see the road, railroads are blocked so that trains are halted, and worst of all farms are practically ruined. The southern part of the High Plains is known as the *dust bowl*.

In the spring of 1934 housewives all along the Atlantic seaboard noticed an unusual film of dust on their furniture. Out of doors the air was full of floating dust. The sky was so hazy that the light of the sun was dimmed as by a great forest fire. Radio and newspapers explained the mystery. Violent dust storms in the dust bowl were lifting the soil and actually carrying it two thousand miles to the eastern coast. The farms of the dust bowl were in reality being blown away.

This region is subject to dust storms for several reasons: first, the rainfall is very light; second, the region has been overgrazed, that is, the cattle have removed the grasses until there is no protection from the wind; and, third, much land has been plowed which should have been left covered with grass. These are the areas which were aban-

done by wheat growers when the demand for wheat fell off after World War I.

Loss of soil by wind erosion must be prevented wherever possible. Land in semiarid regions best adapted to grazing should not be plowed. Plowing removes the thin cover of grass whose roots hold the soil in place. Where the protecting coat has been removed, grasses or other crops with traveling roots should be planted to hold the soil in place. Unless wind erosion is checked, hundreds of square miles of farm and grazing land will be made useless.

Water erosion. Like wind erosion rain erosion is going on everywhere. Fifty years ago in one of our southern states water running from the eaves of a barn made a little gully by washing away the soil at the corner of the barn. Later rainstorms made the gully deeper and wider. The barn was undermined and toppled over into the gully. After a time the house too fell in and then the schoolhouse. Other gullies from the hillside entered the first gullies. Some of them were more than a hundred feet deep. The farm was ruined, and the farmer and his family had to find a new home.

Farm lands destroyed in this way can never be restored. Of course rain erosion does not go on so rapidly in many parts of the country, but it is taking place everywhere that rain falls. Such erosion should be checked as much as possible. This can be done by plowing the land so that furrows will hinder the flow of water. Gullies can be dammed and the hillside terraced.

CONSERVING OTHER RESOURCES

Wild life. In addition to petroleum, coal, and iron there are many other resources which must be used with great care. There was once a plentiful supply of lobster along our northeastern coasts. Because the numbers have been greatly reduced, it is necessary to import large numbers from Canada. Alaskan seals were in danger of extinction until laws were passed protecting them. Fish hatcheries are established beside lakes and along the shore so that the supply of fish for food and sport will be maintained. Wild animals, such as deer, moose, grouse, and many others, are protected by closed seasons when they cannot be hunted. In some states deer may be hunted for only one month of the year, or the closed season may last several years. These are only a few of the many valuable resources which must be conserved for our own use and for the future as well.



Photo by James Sawders

Why is a sign like this placed along the roadside by the Federal Government? Who benefits by the protection of wildlife? How? This sign is on U. S. 27 Highway near Houghton Lake, Michigan.

The conservation of health. A country's greatest resource is its people. The health and education of citizens is of far more importance than lands and minerals. Ill-health brings suffering, loss of employment, and expense. In case of a severe epidemic a whole region may be paralyzed. In 1348 a disease known as the *Black Death* swept over all Europe. More than half the people of England died. Ordinary duties could not be performed. Crops rotted in the fields and cattle roamed over the land uncared for. Centuries later French engineers failed in their attempts to construct a canal across the Isthmus of Panama mainly because they could not cope with yellow fever which killed their workmen by hundreds. After it was proved that the germs of yellow fever were carried by mosquitoes, General Gorgas under the direction of the United States Government destroyed the mosquitoes and then no such difficulty was encountered in constructing the canal.

Such experiences as these force upon people a realization of the importance of health. Gradually it has been learned that even health can be conserved. One of the best ways to conserve it is by proper diet. We have found the causes of many diseases, how they are carried from person to person, and in large measure how they may

be prevented and cured. Jenner, an English country doctor, discovered the method of vaccination by which smallpox has been brought under control. Pasteur taught the world how to fight disease through the destruction of germs.

During our Spanish War more soldiers died of typhoid fever than were killed in battle. Now the use of serum has practically eradicated the disease. It has been found that cleanliness brings health. Sewage and other waste must be properly disposed of. Water, food, and air must be kept pure.

What State Governments do. Epidemics of yellow fever, smallpox, and other diseases have compelled governments to take measures to protect the health of all the people. Ravages of yellow fever led the state of Louisiana in 1853 to establish a State Board of Health. Later other states followed its example.

State Boards of Health provide hospitals, inspect food, and enforce laws protecting the health of workers in factories and of children in the schools. The State Boards also distribute serums to prevent the spread of diseases of various kinds. Circulars are published and distributed so that the people of a state will know what are the proper foods to eat and otherwise how to care for their health and safety. Departments of Public Safety license drivers of automobiles and trucks and enforce laws of the highways and in this way reduce the number of accidents. Thus State Governments protect the health and safety of the public.

The Federal Government's interest in health. The Bureau of Public Health is a division of the Federal Government. It prevents the transportation of impure foods and drugs from one state to another. The health of all immigrants is carefully inspected before they are permitted to enter the country. The Bureau enforces laws prohibiting the importation of diseased animals into the country. The Federal Government is responsible for the health of its soldiers and sailors. Hospitals are maintained for the care of the sick and the wounded. These are only a few of the many interests the Federal Government has in the health of the people.

GUIDES TO STUDY

1. Why should the people of a country use their resources with careful thought of future needs?
2. What are the different ways in which our forests may be conserved? How can every individual help?
3. How does the conservation of water power differ from that of most other resources?

4. Why does the Federal Government undertake the large water power and irrigation projects?
5. In what parts of the country are most of the irrigation projects? Why?
6. Why may mining be called a robber industry?
7. Why should we be particularly careful of our petroleum reserves?
8. In what ways can we make our supplies of petroleum last longer?
9. Why are minerals and metals more difficult to conserve than wood and water power?
10. What are some of the ways in which we can use coal economically?
11. Why should we use water for power wherever possible?
12. Why is the production of articles made of non-strategic materials restricted in wartime?
13. How does the junkman aid in conservation? What commodities besides iron does he help conserve?
14. In what ways is soil going to waste? How can this waste be lessened?
15. Why should countries conserve their wild life? How can it be done?
16. In what sense may we think of health as a country's asset?
17. In what ways may the health of a community or a country be protected?
18. How do the various government agencies aid in the conservation of health?
19. How has World War II brought public attention to the need for conservation of our natural resources?

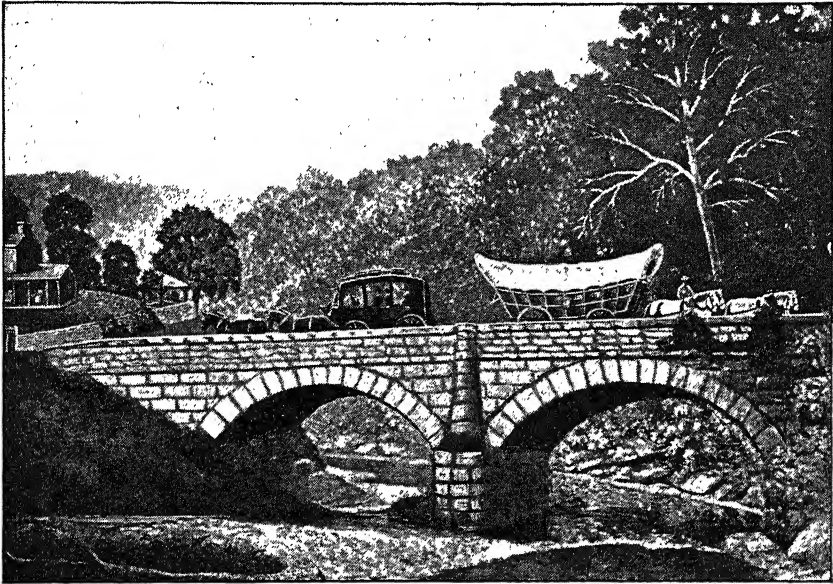
TOPICS FOR CLASS DISCUSSION

1. How everyone of us can aid in conservation.
2. The prevention of forest fires.
3. Substitutes for wood.
4. Rivers as servants.
5. When our petroleum wells run dry.
6. The waste of war.
7. How the farmer can prevent soil erosion.
8. How employers try to keep their workers well. Why?
9. The airplane's part in conservation.

WORK TO BE DONE

1. Appoint individuals or committees to study and report to class topics in which the class is particularly interested.
2. After thorough study of one of the topics listed above appoint a member of the class as chairman to take charge of the class work during the discussion.
3. Choose a member of the class to write to the Bureau of Reclamation, Washington, D. C., for information on erosion and irrigation and power projects.
4. Locate on a map of the United States Boulder Dam, the Tennessee Valley, Muscle Shoals, and the Grand Coulee Dam.
5. Study how a great dam project may completely remold the face of the earth about it and the lives of the inhabitants.

UNIT XII. TRANSPORTATION BY LAND, SEA, AND AIR



Courtesy Philadelphia Commercial Museum

Transportation in colonial times was largely by stagecoach and Conestoga wagon.

1. AMERICAN TRADE ROUTES—PAST AND PRESENT

How improvements in modes of travel have changed geography. Before man learned to use boats, bodies of water, even rivers, were barriers to travel. When the dugout was put into service, rivers became highways. When swollen by seasonal rains, rivers often wrought devastation by overflowing their banks and flooding the lowlands. Then by dikes and dams man learned to control the pent-up energy of flowing water and utilized this source of power in turning machinery and diverted the streams into channels for irrigating adjacent farm lands.

Elsewhere you have been told of the slow processes by which man has conquered time and distance. Sometimes centuries elapsed with little improvement of modes of travel. But each conquest by means of a new improvement or new invention has brought about new sets of relationships that have changed the social, political, and economic outlook and condition of mankind. New adjustments have had to be made in man's thinking and acting as a result of the new environment thus created, and a changed geography has resulted.

Travel in our colonial period. Our own country affords a good example of the changing concepts and adjustments that have taken place in the comparatively short history since the first settlements were made. In colonial days travel was on foot, on horseback, in covered wagon, or by canoe or sailboat. The first settlements were made along the coast where a sheltering harbor offered easy access to the sea or near the mouth of a tidal river along whose banks fertile land afforded opportunities for raising corn and tobacco and pasturage for domestic animals. These communities grew up in isolation and were scattered along the eastern shores of the Atlantic from New England to the Florida Peninsula.

There were few roads connecting these settlements except the narrow Indian trails, and these were hazardous because of hostile Indians who resented the intrusion of the white man. Often dense forests or steep mountains or wide rivers were physical barriers that intervened between communities and left them isolated from each other. Consequently there was little interchange of ideas or commodities between the settlements.

Why the colonists traded with Europe. Hence trade with Europe by sea furnished more opportunity for exchange of goods and ideas than did domestic trade. Besides manufacturing was practically unknown and England especially was able to supply the wants of the colonists for things necessary for their comfort.

A sailing vessel could go from Boston to Plymouth, England, and return in less time than a traveler could go overland from Boston to Jamestown, Virginia, and return. Therefore, there took place a large development of seaports, such as Boston, New York, Philadelphia, Baltimore, and Charleston. Along the Fall Line where navigation stopped on the east-flowing rivers of the Atlantic coastal areas, towns sprang up, such as Richmond in Virginia, Raleigh in North Carolina, Columbia in South Carolina, and Augusta and Macon in Georgia. Only hunters and trappers penetrated the upper reaches of the rivers going in canoes or following the courses of the rivers on foot or on horseback.

In fact, many children were born, grew to manhood, and reached maturity without ever traveling more than twenty or thirty miles in any direction from their birthplace.

Pioneers open up the West. Because of lack of roads for more than a century the settlements were largely confined to the eastern seaboard. Then adventurers who had crossed the mountains and forded the rivers to the west returned with glowing accounts of the

wilderness beyond the Appalachian Highland. They told of fertile lands that could be farmed, of the abundance of game, of the blue-grass region, of lakes and streams abounding in fish, of untouched forests—all waiting for men of courage to come and possess them.

As a result of the stories told, pioneers on foot, on horseback, in Conestoga wagons and other vehicles—horse-drawn or pulled by oxen—poured through Cumberland Gap in the South or through the Mohawk valley in the North to build homes in the western wilderness far from friends and from contact with the Old World.

The westward movement. Transportation thus held the key to the westward expansion of people on this continent. The building of turnpikes and canals speeded the westward movement, but even the stagecoach, the freight wagons, and the horse-drawn canalboat proved inadequate to supply the travel and transportation needs of the people who were filling up the back country. It is true that they made travel possible over longer distances and reduced the time of travel, but transportation costs of products between the East and West made trade almost impossible. The western farmer could not send the produce of his farm to the cities of the East nor could he afford to pay to have furniture and other needed articles sent overland because of the high cost. The western settlements had the same isolation to contend with that the colonial communities had suffered from. They had to become largely self-sufficient by producing whatever was needed for subsistence and for comfort. They could have few luxuries.

FROM TRAIL TO HIGHWAY

Early trails. Early roads in all countries were dirt roads, that is, the people rode their horses and drove their wagons over land surfaces on which little or no work had been done. It is often said that the many winding streets in the city of Boston were once cow-paths. The simplest route between towns was a trail over which people walked or rode on horseback. These roads at first were so poor that the only way the traveler could make sure that he was following the right path was by carefully watching for the blazed trees on either side of the way.

Up to 1800 there were few roads in the United States. As settlements spread over larger areas, the need of roads became greater. Roads were widened and improved by covering the ground with planks or in swampy places with logs. Over these improved highways a horse could draw several times as much as he could over an

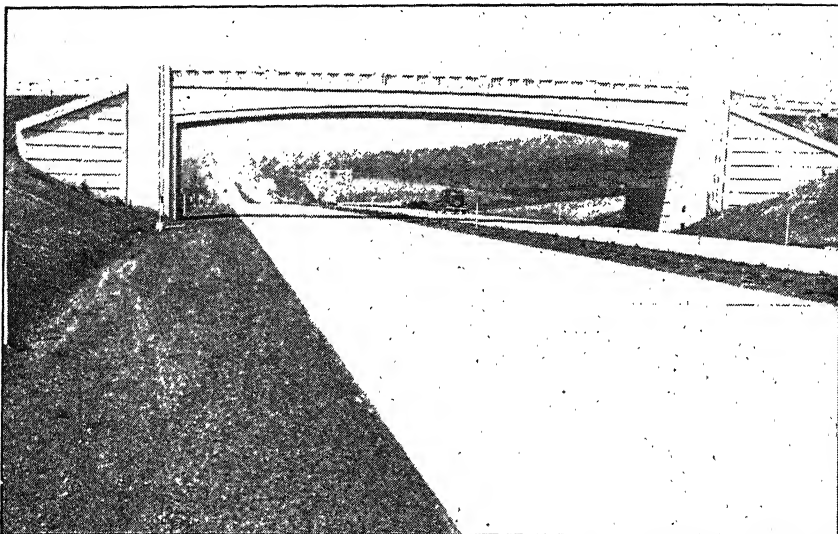


Photo by James Sawders

The Pennsylvania Turnpike, the world's finest express highway, running from Harrisburg to Pittsburgh without a single intersecting highway. It has no steep grades and follows old railroad tunnels through the mountains.

ordinary dirt road. Many of the improved highways were constructed by individuals or companies and toll was charged for their use. Even today some of our most expensive bridges are financed by the payment of tolls by those who use them.

Superhighways. Highways have been improved as people demanded better roads. In the last twenty years of the past century came the bicycle demanding smoother roads. The bicycle was followed by the automobile and the truck requiring hard level surfaces capable of supporting heavy loads. Roads have been widened, hills leveled, hollows filled, and bridges constructed. Even in farming regions where population is sparse, good roads are necessary for the farmers' cars and trucks.

Modern highways are being constantly improved. Funds are provided by towns, cities, states, and the Federal Government. Grassy parkways divide the highways with sometimes several lanes on either side. National automobile routes extend from Canada to the Gulf of Mexico, and from the Atlantic to the Pacific.

THE ALL-AMERICAN HIGHWAY

The northern section. When completed this great highway will extend from the Arctic circle to the vicinity of Cape Horn, the south-

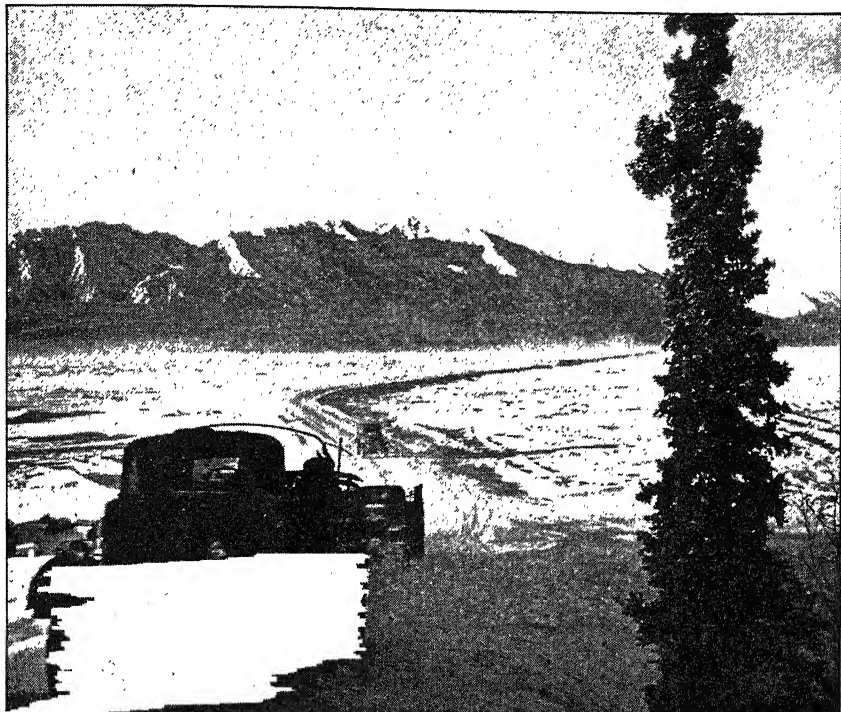


Photo by Ranny Jaques from National Film Board

A convoy of trucks crossing a river on the Alaska Highway. This picture gives some idea of the kind of country crossed by the highway. A pipeline is to be built to bring oil to the road from the oil fields of northwestern Canada.

ern tip of South America. The northern end of this route, the Alaska Highway, recently completed was a wartime undertaking. It extends from Edmonton, Canada, to Fairbanks, Alaska. Great trucks are pulling heavy loads of war equipment from railroad freight terminals in Canada to our outposts in Alaska.

The dream. The Alaska Highway, however, is only a small part of the projected highway running the full length of both North and South America. When complete this great highway will cross eighteen countries including Chile, Peru, Ecuador, Colombia, Panama, Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, Mexico, the United States, and Canada. Branches will extend into Venezuela, Bolivia, and Paraguay. The highway will cross the Andes to connect Santiago with Buenos Aires and Rio de Janeiro. The road is now passable in all weathers from Alaska to Mexico City.

The central section. From Mexico City south to Colombia there is considerable road yet to be built. Over this route portions are passable in dry seasons only while others are marked simply by mule

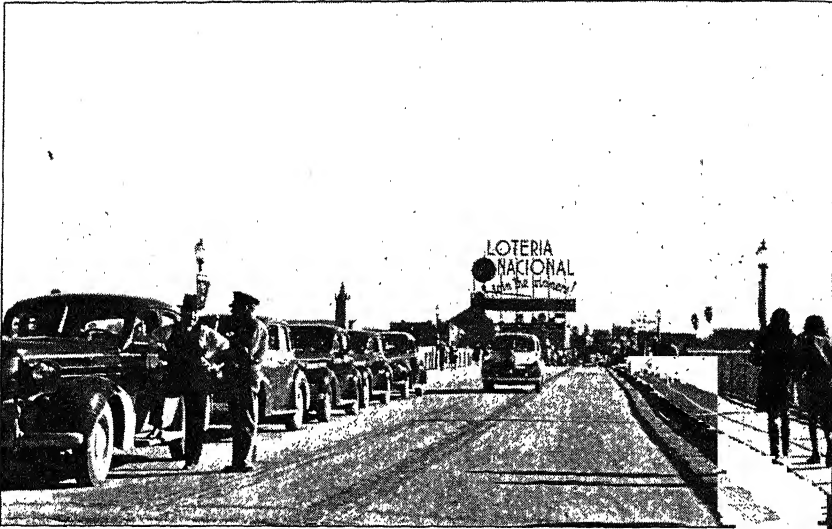
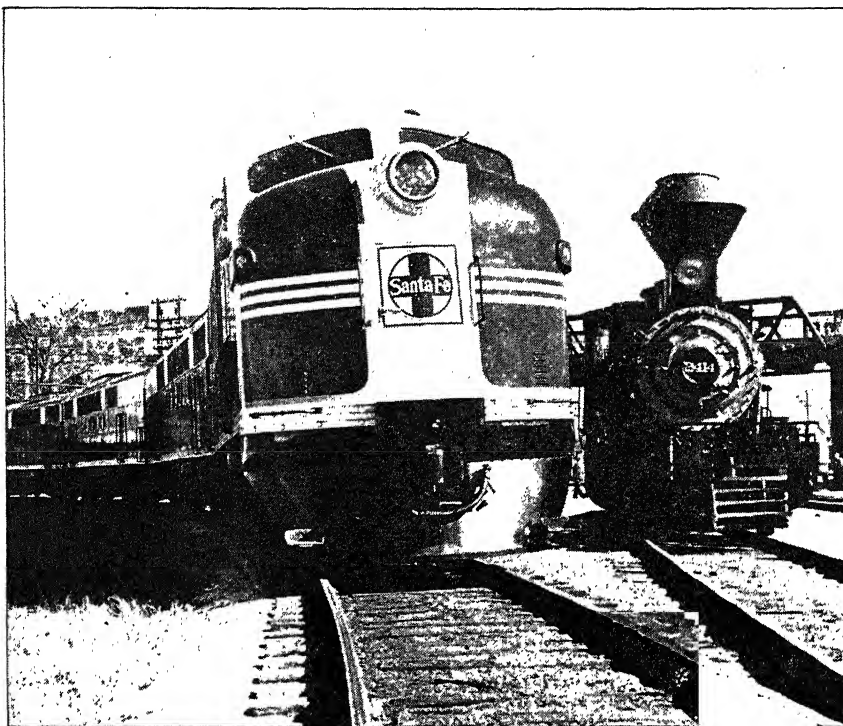


Photo by James Sawders

The International Bridge at Laredo, Texas, which connects the United States and Mexico. Here is the start of the Pan-American Highway.

trails. Richard Tewksbury is the only white man who has forced his way through the jungles of Central America through which the road must be built. The United States is deeply interested in the completion of the Central American portion of the highway, and has appropriated \$20,000,000 towards its construction. The Central American countries have contributed another \$10,000,000 for the construction of this link in the All-American Highway. To hasten the work the United States War Department is also building portions of the road.

The southern section. When the unfinished portions between Mexico City and Buenaventura are completed then the highway will be clear all the way from Fairbanks to Rio de Janeiro and Buenos Aires, except for a two hundred mile break in Ecuador. It is expected that all the projects in Mexico and Central America will be completed sometime in 1944. Where there are short stretches of impassable road, the automobile or truck can be placed on a flat railroad car and carried by rail. In a few short years no doubt the entire highway will be complete and the tourist of postwar days will be able to drive his car into nearly all the countries of the two continents. Such a road should do much to strengthen the ties of friendship between the countries of North and South America. It will also aid in relieving overburdened shipping and railroad lines along its route.



Courtesy Santa Fe Railway

* Santa Fe freight Diesel-electric locomotive and a Santa Fe steam engine of 1880s at Topeka, Kansas

THE COMING OF THE RAILROADS

The American railroads—ribbons of steel. In this day of automobiles, buses, and trucks we are likely to think that the railroad is a relic of the past. That is not true. Railroads are absolutely necessary today both for carrying passengers and for transporting freight. It is true that the railroads have suffered through competition with the newer means of transportation, nevertheless the business of the country could not go on without them. The farmer, the manufacturer, the merchant, and all other workers rely on the railroads to transport their goods. The development of the great resources of our mines, forests, and agricultural lands would have been impossible without the railroads. We may take short trips or even long journeys in automobiles, buses, or by plane, yet the railroad has much to commend it for rapid, safe, and comfortable transportation. In times of war when great numbers of troops must be transported, railroads are absolutely indispensable. There is nothing that can take their place. The transcontinental railroads are keeping well abreast of the

times. Streamlined trains now make the run from coast to coast in less than two and one-half days. The regular schedule of the Twentieth Century Limited between New York and Chicago is sixteen hours. Owing to the use of alloy steels, the train weighs one third less than the trains of former years. Cars are furnished with many conveniences, and one can even travel in luxury.

Our country is well equipped with railway lines. No other country has so many miles of tracks. Nearly one fifteenth of the income of the people of the United States is paid to the railroads for transportation service. In the densely settled Northeast there is a veritable network. West of the 100th meridian there is an abrupt change and from that meridian to the Pacific Coast only a few lines cross the Rocky Mountains.

The railroads are great consumers of raw materials. They compete with the automobile in the amount of iron and steel used. Other metals such as copper, nickel, and aluminum are also needed in considerable quantities. In our study of forests we learned that great quantities of lumber are used for railroad ties and, to some extent, in the manufacture of rolling stock. When the railroads prosper, their demands for raw materials and labor help to make the whole country prosperous.

FROM RAFT TO STEAMSHIP

While the rivers were much used as highways by the early Americans, river transportation presented many difficulties. In a canoe a man could go up or down a stream; the flow of the river helped him or hindered him according to the direction. It required a great muscular effort and considerable skill to paddle a canoe in a swift current. If the canoe was heavily loaded and the stream rapid, progress was slow and came only with great effort. A raft or a flat-bottomed boat could be floated downstream with comparative ease, the chief requirement being to steer it so that it would not land on a sand bar or other obstacle. This method of transporting grain, lumber, and other heavy materials was much used on the Ohio and Mississippi Rivers provided it was being carried downstream. Consequently, the rafts or flatboats had to be broken up and sold for lumber after they had deposited their cargoes at New Orleans, Memphis, or other port of destination because there was no way they could be forced up stream against the current. It was not until the coming of the steamboat that river traffic moved in both directions.

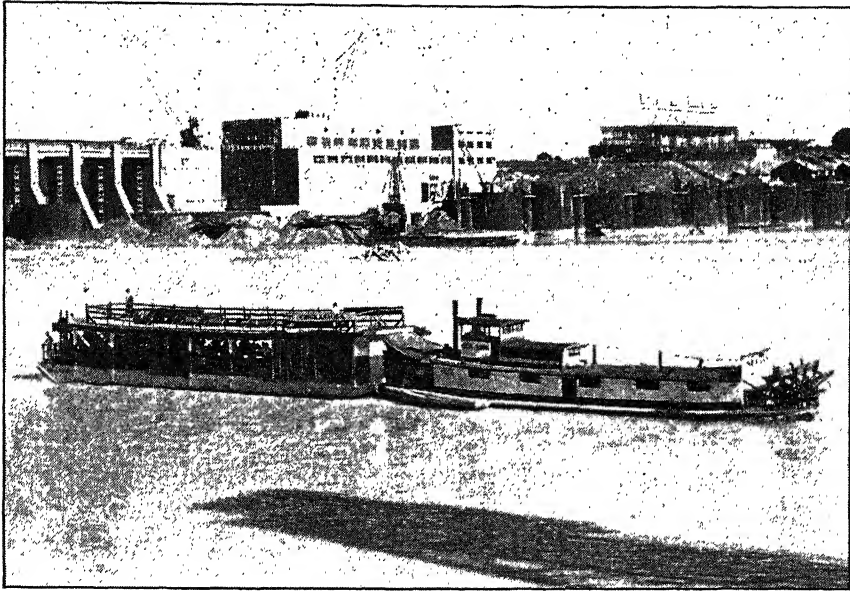


Photo from Keystone View Co.

An excursion barge on the Tennessee River. The excursion barge is being pushed by a shallow-draft stern wheeler. The water of the Tennessee and its branches is made deeper by the dams recently constructed.

The first successful steamboat. Robert Fulton in 1807 was one of the first men successfully to propel a boat with a steam engine. On his first trip he sailed his boat, the *Clermont*, from New York City to Albany in thirty-two hours. To be sure other steamboats had been built and had moved through the water for short distances. But it was really Fulton and the trip of the *Clermont* which proved steam navigation to be possible. Even Fulton had tried again and again without success. But perseverance won and a great advance was made in water transportation. Within a few years after the success of the *Clermont*, steamboats were in use on the Ohio, the Mississippi, and other large rivers.

River traffic in the United States. Steamboats, however, found it difficult to compete with the railroads. Railroads move more rapidly, and, since they reach out to all parts of the country, there is less handling of goods and less frequent changing from one type of travel to another. The Federal Government has spent millions of dollars to improve our rivers and encourage their use, but with rather poor success. Especial efforts have been made to increase the river traffic of the lower Mississippi and the Ohio. The Black Warrior River in Alabama has been dredged to give Birmingham better connection with the Gulf of Mexico and the Atlantic Ocean.



Photo by James Sawders

A lock on the New York State Barge Canal at Lockport, New York. A Boston-bound oil tanker is on its way through the locks.

CANALS AND LAKES

The Erie Canal. In 1825 the Erie Canal was completed, marking a new era in the economic and commercial history of the American people. The Canal extended eastward from Buffalo to Troy and Albany, thus connecting Lake Erie with the Hudson River. For many years this route was used to transport the raw products of the rapidly growing West to New York City and to carry products manufactured in the East to consumers in prosperous communities in the states bordering the Great Lakes. The Erie Canal was probably the chief single factor in making New York City the leading commercial and financial center of the nation, but it was influential in building up a chain of cities along its route which have contributed to a considerable extent to the growth and prosperity of the Empire State.

Before the canal was built it cost one hundred dollars a ton to move goods from Albany to Buffalo. After the canal was in operation it cost only twenty-two dollars a ton. By the time the canal was ten years old the cost had been reduced to four dollars a ton.

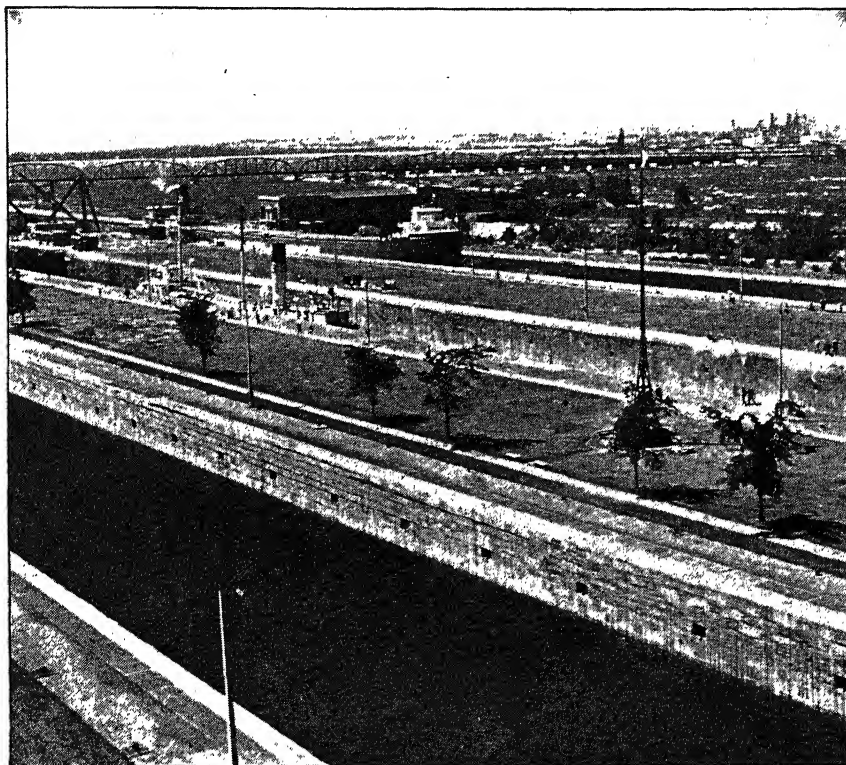


Photo by James Sawders

The famous locks of the Soo Canals which connect Lake Superior and Lake Huron. The tonnage of iron passing through the canal from west to east is very great. Before iron ore was discovered in the Lake Superior region all the products carried over this route were drawn by one horse.

For fifty years or more it carried many people and much produce between the East and the West. With the coming of the railroad its use rapidly fell off. Since the widening and deepening of the canal by the State of New York, however, its usefulness has increased somewhat for the transportation of heavy and bulky articles, such as gravel, coal, and building stone. It is now known as the New York State Barge Canal.

The Great Lakes—the world's largest inland waterway. The Erie Canal owed its usefulness to the fact that it was the first connecting link between the Atlantic Ocean on the east with the Great Lakes on the west. Early French explorers, trappers, and pioneers found the Great Lakes a great help in their wanderings westward from the headwaters of the St. Lawrence. These great bodies of water play a large part in solving the transportation problems of the Middle West. Great quantities of iron ore, lumber, and wheat move

east and south over their waters. Easy and cheap water transportation bring ore of the iron mines of Minnesota and Michigan to the coal of Pennsylvania and West Virginia. Duluth, Chicago, Cleveland, and Pittsburgh become almost next-door neighbors. Cheap transportation of ore reduces the cost of iron and steel. Grain moves east to Buffalo and that city leads all others in flour milling. Ore-bearing ships return to Duluth laden with coal for the iron and steel plants of that city. These lakes of course serve Canada as well as the United States. Unfortunately all shipping on the Great Lakes is held up by the cold of winter. The leading ports bordering the lakes are Chicago, Detroit, Cleveland, Toledo, Erie, Buffalo, Milwaukee, and Duluth.

Canals of the Great Lakes. Rapids separate Lake Superior from Lake Huron making a canal with locks necessary. As ore- and coal-carrying ships increased in size, locks of the Soo Canals were made wider, longer, and deeper. These are the world's busiest canals. Although open only eight months of the year, the tonnage passing through the locks is greater than that of the Panama and Suez Canals combined. On the average a ship passes every eighteen minutes. There has been an almost constant demand for bigger lake ships and larger locks.

The Welland Canal enables ships to pass around Niagara Falls. This canal has been recently enlarged to accommodate ocean-going ships. It is expected that sometime in the future ocean vessels will ascend the St. Lawrence and sail over the Great Lakes to all important lake ports. A treaty has already been signed by representatives of the United States and Canada, but it awaits confirmation by the Canadian Parliament and the United States Senate. The treaty provides for construction of dams and locks along the St. Lawrence, thus making that river above Montreal navigable for large ocean-going ships. Several million horsepower of electricity would be developed which no doubt would be shared by the two countries.

FROM RIVER AND LAKE TO THE OCEAN

Steamers cross the ocean. When the steamboat first appeared, a Dr. Lardner of London stated positively that no steamboat would ever be able to cross the ocean and that he would write a book to prove it. He wrote the book and it was brought across the Atlantic to America—on a steamboat. In 1819, the *Savannah*, an American steamboat, sailed from New York to Liverpool in twenty-six days.

SHRINKAGE OF THE OCEAN



1838
FIRST STEAMSHIP



1938
"QUEEN MARY"



1940
CLIPPER



Pictograph Corporation for Public Affairs Committee, Inc.

This diagram shows how greatly the time required for crossing the Atlantic has been reduced. We might add to the diagram the record for 1943 which is about 400 minutes.

Since that time the size of ocean-going steamships has constantly increased. Rival companies strive to build ships larger and faster than those of their competitors. Floating palaces, such as the *Queen Mary* and the *Normandie*, used to cross the Atlantic in about four days.

Merchant marine at home and abroad. The ships of a country which carry merchandise are known as the country's *merchant marine*. Great Britain led all other countries in the number of its merchant ships. Other countries in order were the United States, Japan, Germany, Norway, the Netherlands, France, Italy, and Sweden. A large merchant fleet is a great help to a country in a number of ways. With such a fleet it is not dependent upon other countries to carry its goods. This is particularly important in time of war. A fleet large enough to carry goods of other nations as well as those of the homeland is a source of income to a country. Em-

ployment is given to sailors, to shipbuilders, and to business houses which control the ships.

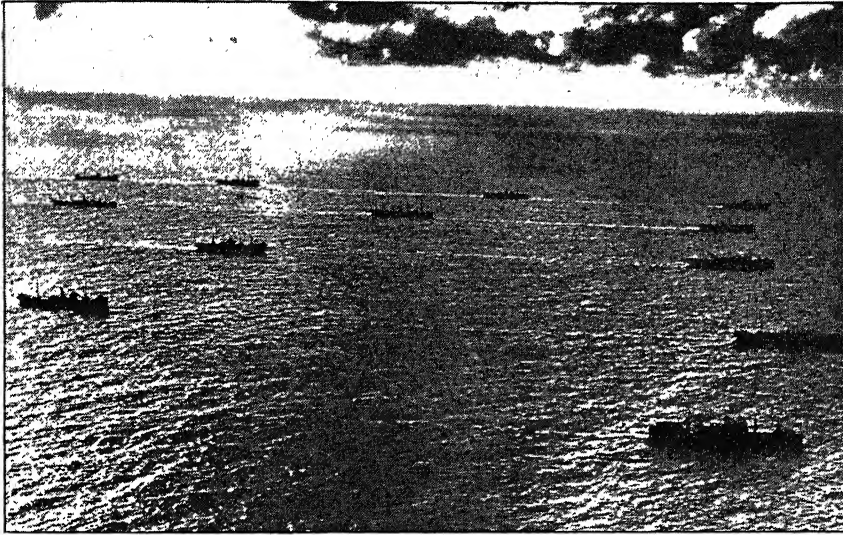
THE AMERICAN MERCHANT MARINE

Clipper ship days. The American merchant fleet was in its prime in the days of the famous Yankee clipper ships from 1830 to about 1860. The ships of no other country could compete with the clippers. Fast and profitable voyages were made to South America, around Cape Horn to California, and to the Far East especially to China. The shipbuilders, shipowners, and sea captains amassed large fortunes. Many captains were able to retire at the age of thirty.

Decline of shipping. With the coming of steel ships and steam the American merchant marine rapidly declined. During the War between the States the fleet suffered greatly. Some of the vessels were used as warships, and many were captured and destroyed. From time to time after those years strenuous efforts were made to restore our merchant fleet to its former high position, but with many discouraging rebuffs. Far-sighted men who realized that a great nation like our own should maintain a merchant marine as well as a navy importuned the Government to take a hand in putting shipping on an even keel once more.

The revival of shipping. Not until the year 1936 could Congress be persuaded to take any action in the matter. In that year a Maritime Commission was created. About two years later, when it really got underway, it began by consolidating ship lines and granting subsidies and loans to shipping firms. It also established a maritime service for training ships' officers and men. Laws for the better treatment of sailors were passed. Plans were made for the construction of fifty ships a year for ten years. In the year 1940 the world's shipping amounted to 65,000,000 tons. Great Britain owned thirty-one per cent. We ranked second with nineteen per cent. It is interesting to note that Japan and Norway came next with seven per cent each, then Germany with six per cent and Italy with five per cent. Russia had only two per cent.

Shipping in World War II. The first effect of the outbreak of World War II was to boom our shipping. As in World War I when ships of foreign countries were called home, our shipping began to pick up. Then came the Congressional Act which forbade our vessels to arm or to travel to belligerent ports or through combat areas. Then our ships had to confine themselves to coastwise traffic.



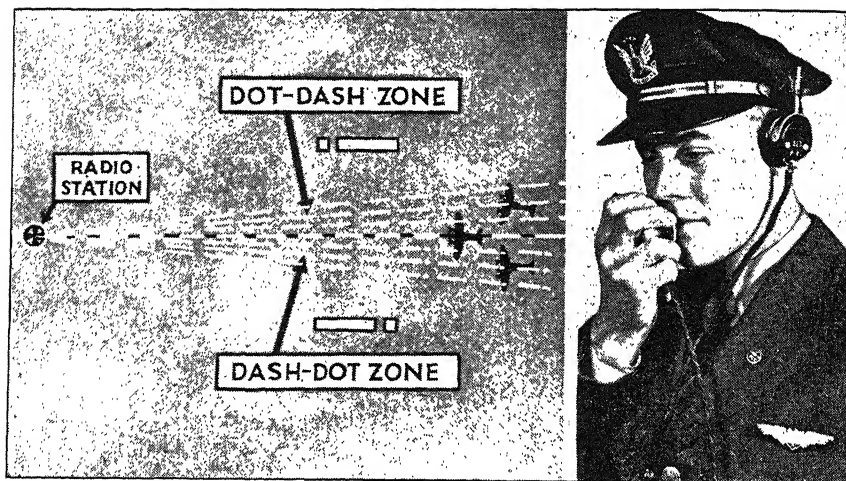
Courtesy U. S. Maritime Commission

Convoys are winning. Sturdy cargo ships fill the sea lanes leading to all fronts carrying guns, tanks, and planes for our forces and those of the United Nations.

But again, as in World War I, the German submarines, "the rattlesnakes of the Atlantic," were once more on the loose and there was no guarantee of safe passing to a neutral vessel if she was suspected of carrying contraband.

After Pearl Harbor we found ourselves up against the Jap menace. All merchant vessels are now armed. Lone vessels do make voyages, but the only safe way to sail is in convoy. By convoy, in spite of the submarine menace, we are getting our forces and supplies to the so-called "hot corners" of the globe. We are getting lend-lease goods to England, to Russia by the way of Iran as well as by Murmansk, to Australia, and to India for the use of China. Until the success of the Tunisian campaign our vessels going to Iran or India were obliged to round the Cape of Good Hope. With the reopening of the Mediterranean we are subtracting thousands of miles from the length of voyages and adding thousands of tons to our carrying capacity. The fifty ships a year of the Maritime Commission have become a host and the numbers will continue to increase until once again the "freedom of the seas" is a fact as well as a slogan.

Over land and sea. The latest innovation in transportation has been accomplished by use of the airplane. The experimental stage of aviation over, companies were formed to establish airlines connecting all the important cities of the country and to build airports as



Courtesy United Air Lines

This picture depicts the directive radio beam system of marking airways maintained by the Bureau of Air Commerce. When flying their true course pilots hear a constant hum in their earphones. If they veer to one side the signal changes to a dot-dash, dot-dash. On the other side of the true course the signal changes to dash-dot, dash-dot.

terminals of those airways. In 1941 we had sixteen domestic airlines operating on regular schedules. They carried mail, express, and a total of 3,400,000 passengers. For several years awards have been made to companies showing the best safety records. In 1940 one company, the American Airlines, received a special award for operating more than a billion passenger miles without a single fatality. Beacon lights have been established to guide the planes in their flights and weather forecasting service maintained. Since our entry into the war the United States Weather Bureau has assumed responsibility for the latter service. While there is more transoceanic flying today than ever before, it is strictly regulated and wholly of a military nature. Peacetime will see a resumption of transoceanic service on a scale scarcely dreamed of a few years ago.

Reasons for the importance of our commerce. No other country except Britain had a prewar foreign trade greater than ours. Our place in the commercial world was due largely to a wealth of natural resources. Although the climate of the entire country is temperate, yet there is a wide range of climatic conditions from the lands of cotton, sugar cane, and citrus fruits in the South to the spring-wheat regions of the North. Furthermore our people are energetic and progressive and have made good use of the country's resources.

The Federal Government aids commerce. Officers, known as *consuls*, represent the Government in all friendly foreign countries.

It is their duty to be familiar with all matters which will help to increase our trade with the country to which they are appointed. They also collect and send to Washington information which may be of value to American businessmen in any way. Besides maintaining offices in foreign countries our Department of Commerce has offices in all important cities of the United States. From these offices our businessmen may gain information of the trade conditions in any part of the world.

The War Department maintains lighthouses, marks channels, dredges harbors, and, as far as possible, makes the rivers navigable. This Department also collects and publishes information having to do with the trade between one part of the country and another and between the United States and foreign countries.

GUIDES TO STUDY

1. How did man in early days overcome the barriers to travel and transportation?
2. Why did the colonists often find trade with Europe easier and cheaper than trade with near-by colonies?
3. What was the lure of the West and how was the new land reached?
4. Why was toll charged for the use of many of the early roads and bridges. Why are there few toll roads today?
5. What were the chief routes across the Appalachian Highland followed by the early pioneers, and what were their modes of travel?
6. What competition do the railroads have now that they did not have in former years?
7. Describe the All-American Highway and tell of its advantages section by section.
8. In what ways are railroads a necessity to a country's industrial life. How have American railroads made possible the development of the country?
9. A map showing the distribution of railroads in a country is really a population map. Explain.
10. List all the ways in which rivers aid communication and transportation.
11. Why does river traffic in the United States find it difficult to compete with railroads?
12. What cities are benefited most by transportation on the Great Lakes? Give reasons for each city.
13. Tell of the rise and decline of the American merchant marine in the last century.
14. What does it matter whether the goods of a country are carried by its own ships or by the ships of other countries?
15. Why did our merchant marine find it difficult to compete with that of Great Britain, Japan, and other countries?
16. How did World War II stimulate shipping?
17. Why in peacetimes does our country have a large foreign trade?
18. How does the Federal Government aid foreign trade?

TOPICS FOR CLASS DISCUSSION

1. Travel in colonial days.
2. Turnpikes, toll roads, and toll bridges.
3. The All-American Highway.
4. The beginnings of the railroad.
5. Competitors of the railroad.
6. The first steamboats.
7. The New York State Barge Canal.
8. Canals of the Great Lakes.
9. The building of merchant ships today. (See pp. 204-213.)
10. Our foreign trade.

WORK TO BE DONE

1. Select topics from the above list for special study and report by one or more members of the class.
2. Make a study of the pictures in this section and in other parts of the book and summarize all they tell of transportation.
3. Secure information from newspapers, magazines, and other books relating to transportation and report to class.
4. List the steps in the development of means of communication from earliest times to the present.
5. What inventions have been responsible for the great advances made in transportation and communication?
6. Find out all you can about the proposed deep waterway from the Great Lakes to the Atlantic Ocean.

2. GATEWAYS AND GREAT CROSSROADS OF OUR COUNTRY

Doorways of the coast. In peacetime the United States has ready access by sea to all parts of the world. The Atlantic ports face Europe and Africa, and by way of the Mediterranean and the Panama Canal extend their routes even to the Far East. The ports of the Gulf Coast have similar advantages and all ports of our eastern and southern coasts are favorably located for trade with all parts of South America. Ports of the Pacific are especially well placed for trade with Asia, Australia, and the western coast of South America. By way of the Panama Canal these ports also carry on a profitable trade with ports of our Atlantic and Gulf Coasts and with Europe.

The industries and trade of cities have been greatly changed by war production. In the section of this text entitled, "Victory Is Our Nation's Business" we gain some idea of the changes in all cities due to the war. In this section only the industries and trade of peacetimes are considered.

*Photo by James Sawders*

Freight boats in the harbor at Boston

Boston. This port is primarily the gateway of New England. Its imports are mainly raw materials for New England's varied industries and foods for one of the most densely settled parts of the country. Boston's exports are not large since many of the manufactured products of the surrounding region move west and south to all parts of the United States. Textiles, boots and shoes, and hardware are among New England's leading products. For their production cotton, wool, hides and skins, and rubber must be imported. The manufacture of paper is an important New England industry, and for its mills wood pulp is normally imported from Canada and Scandinavia. Boston has large sugar refineries and secures its supplies of raw sugar mainly from Cuba. In addition to its traffic in goods, Boston, the "Hub of the Universe," is a leading port for foreign travel when travel is possible. About 100,000 people used to enter or leave its port each year.

New York. This city next to London is the largest city in the world. The history of London dates back about 2000 years while New York has made its astonishing growth in a little more than 300 years. Only unusual advantages would enable a city to grow at this rapid rate. It has an excellent location at the mouth of the Hudson River where there is an excellent harbor with miles of water front.

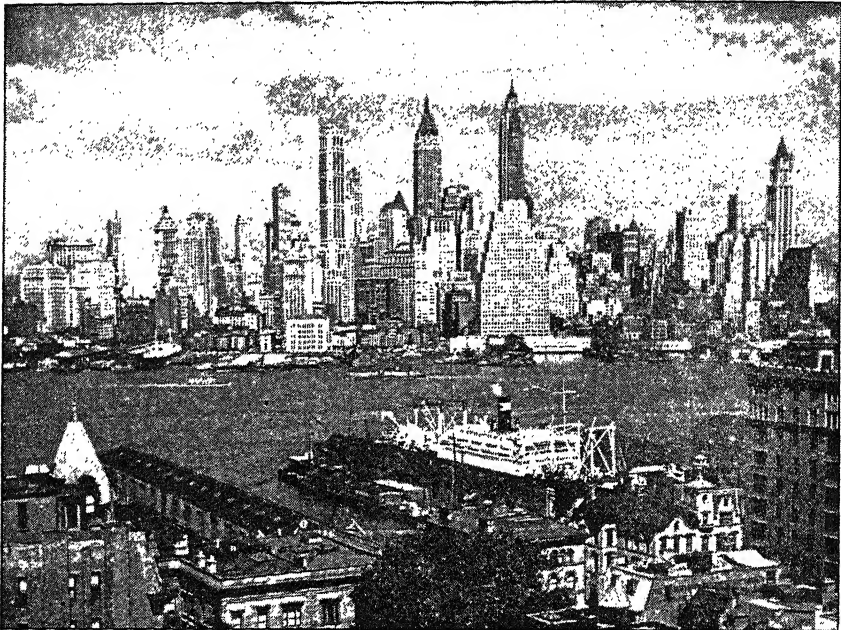


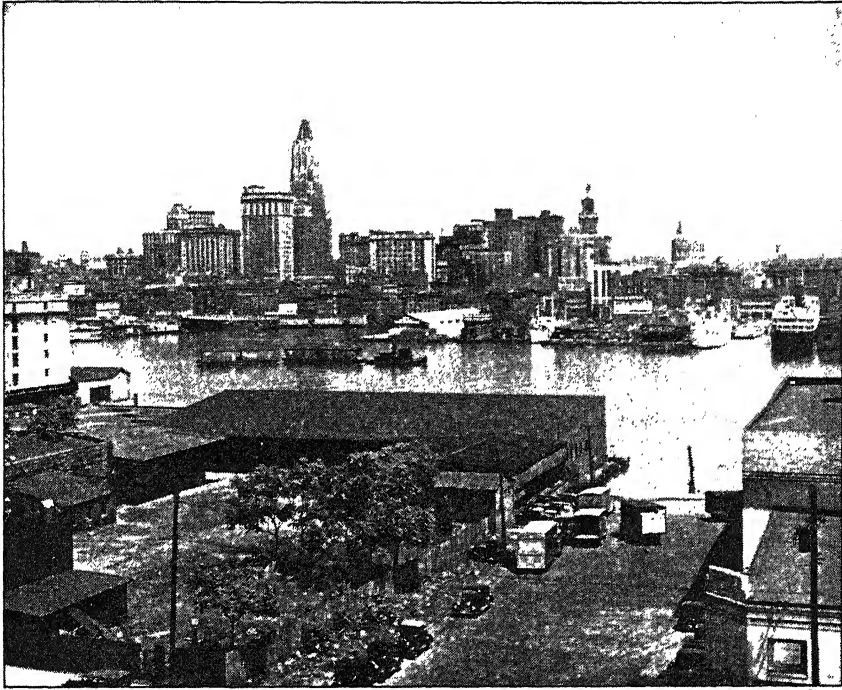
Photo by James Sawders

The waterfront of New York City as seen from the Brooklyn side of East River. Since Manhattan Island on which New York is located is surrounded by water, the only direction in which the city could expand on the island was upward.

Even before the days of the railroad, the port was connected with the Middle West by way of the Hudson River, the Erie Canal, and the Great Lakes. Later this route along the Hudson and the canal proved to be a very easy one for railroads, thus bringing to New York more Western trade than went to any other city of the coast.

The region which the port of New York serves, its *hinterland*, is really the whole United States. Products of all kinds from all parts of the United States leave the country by way of this port, and imports coming here are distributed throughout the length and breadth of the land. So great is the demand for water front along which docks can be built that the facilities for handling freight and passengers have been extended to Long Island and even to the shores of New Jersey. On the Jersey side of the river are great plants for refining petroleum and copper.

A small part of the port of New York has been set aside as a *free port*. To this area on Staten Island goods may be admitted duty-free provided they are not sold in the markets of this country. In the free-port area the products may be cleaned, refined, reassembled, and otherwise prepared for their final markets. The value of the free-port

*Photo by James Sawyers*

Shipping in the harbor at Baltimore and a view of the city's skyline

privilege is to permit goods to enter the country and be reshipped to foreign lands without the payment of tariffs when they enter the United States.

New York is well located for coastwise trade both to the north and to the south and by way of the Panama Canal with Pacific ports. Because of its many advantages the commerce of the port in normal times is almost equal to that of all of our other ports combined. Because of its great importance as an industrial and commercial center, New York is doubtless the world's greatest banking and financial city.

Philadelphia. This city has an excellent harbor on the Delaware River and is so placed that it serves as the port for Delaware and southern New Jersey, as well as Pennsylvania. Its nearness to the great coal fields of Pennsylvania and West Virginia has helped to make its hinterland one of the greatest industrial areas of the country. Among the leading exports of this port have been products of petroleum, manufactures of iron and steel, and grains from the Middle West.

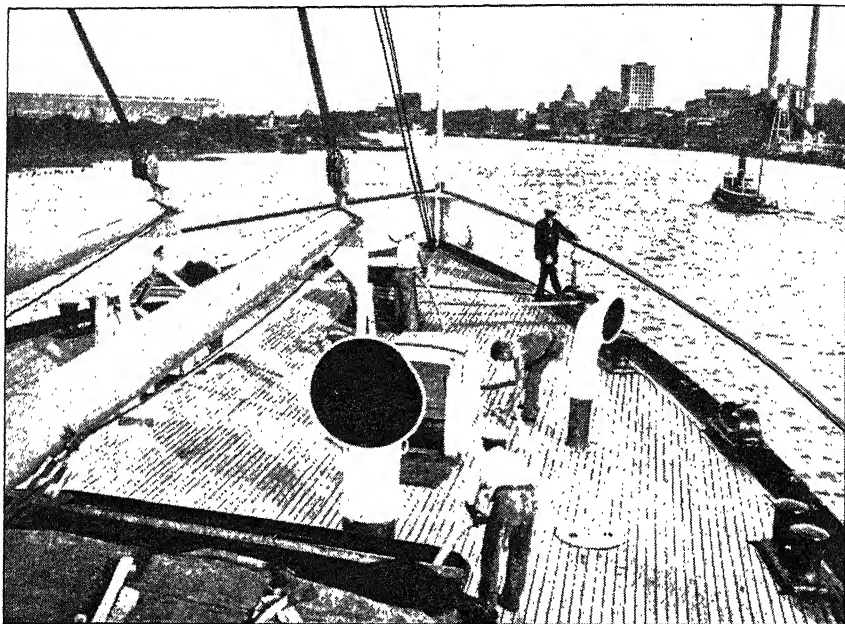


Photo by James Sawders

The city of Savannah on the Savannah River. This city has long been noted for its exportation of lumber and cotton.

Baltimore. This port is located on the Patapsco River near the head of Chesapeake Bay. Its nearness to coal fields has led to the smelting of iron and the refining of copper. These industries in turn have influenced the commerce of the port. Partially refined copper is brought here from Chile, Peru, Cuba, and other countries, and, after being refined, it is distributed to local and foreign markets. Iron ore comes from Chile and Cuba because transportation by water is cheaper than by rail from the interior of our own country. Grain and other farm products from the Middle West were formerly shipped through Baltimore to foreign countries. It is also one of the leading ports through which Canadian grain has passed on its way to Europe when St. Lawrence ports were closed by ice.

Surrounding Baltimore are many market gardens and truck farms. These farms together with the oyster beds of Chesapeake Bay make the city of Baltimore one of the leading canning centers of the country.

Norfolk, Portsmouth, and Newport News. These cities are all located about the fine harbor of Hampton Roads, a channel through which the James and other rivers reach Chesapeake Bay. Norfolk was the leading coal-shipping port of the Atlantic Coast. Other

important exports leaving the country from the ports of Hampton Roads were cotton, tobacco, lumber, and naval stores.

Other Atlantic ports. Charleston, South Carolina, and Savannah, Georgia, are the leading ports of the South Atlantic Coast. Their leading exports were cotton and lumber. Because commercial fertilizers are extensively used on the cotton lands and truck farms of the South, raw materials for the fertilizer plants are received through these ports.

New Orleans. Located one hundred miles from the mouth of the Mississippi River, New Orleans is the leading port of the Southern States. It is connected by river and rail with the whole Mississippi Valley. Cotton and grain left New Orleans for European countries. From this port southern pine formerly went to Europe and many countries of South America. The leading imports have been bananas from Caribbean countries, sugar and molasses from Cuba, and bauxite from Surinam on its way to St. Louis for partial refining. Before the war large ferryboats carrying ninety-five loaded cars plied between New Orleans and the ports of Cuba.

Houston. As a result of almost miraculous growth this city has come to be the leading port of Texas and one of the chief ports of the United States. Its rapid development was due to the construction of a ship canal fifty miles long connecting the city with the Gulf of Mexico, thus making Houston an ocean port. The canal tapped an exceedingly rich hinterland producing great quantities of cotton, grain, beef, and petroleum. These products serve as raw materials for a large manufacturing industry. Houston's industrial plants consist of petroleum refineries, cotton compresses, rice mills, textile mills, fertilizer works, and meat-packing plants. The exports of Houston have been mainly petroleum products, cotton, and grain. Thousands of ships entered and left the port each year. In amount of tonnage Houston ranked fifth among all American ports.

Galveston. This city is located on a low, level island near the mainland of Texas. It is protected from tropical hurricanes by a sea wall seventeen feet high and more than five miles long. Railroads connect the city with the mainland so that inland freight can be brought directly to the docks. The commerce of Galveston and Houston is very closely related and the exports are much the same since both ports serve the same region. No other port in the world handles so much sulphur as Galveston.

Mobile. This port is located on the Mobile River about thirty miles from the Gulf. Its hinterland is both agricultural and industrial.

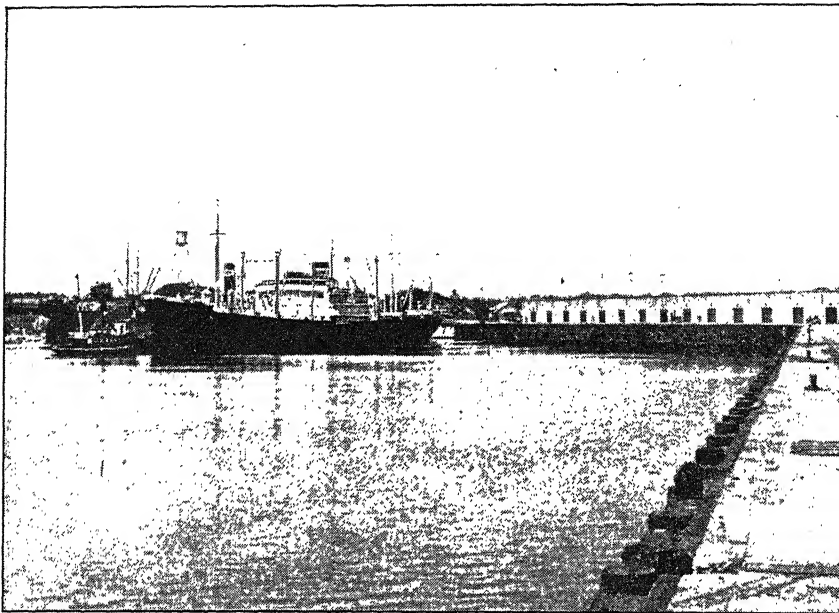


Photo by James Sawyers

View of the turning basin of the Houston ship canal that makes this city a seaport

It has water connection by means of river and canal with Birmingham and might be thought of as the port of Birmingham. The principal products leaving the port have been iron and steel from Birmingham, lumber, and naval stores. Among its industries is a large paper mill for making strong wrapping paper. Pulpwood is obtained from the pine forests of the South.

San Francisco. This city is situated on San Francisco Bay, which is connected with the Pacific Ocean by a narrow strait, known as the *Golden Gate*. Across this strait there is a suspension bridge having a span longer than that of any other bridge in the world. Another great bridge connects San Francisco with Oakland across the bay.

San Francisco has for its hinterland the Great Valley of California, an exceedingly rich agricultural region. This city is in large measure a port for all the Pacific States with their wealth of forests, petroleum and other minerals, extensive fisheries, and a great variety of agricultural products. Its location is also favorable for trade with the Far East, with western South America, and with Atlantic ports by way of the Panama Canal.

San Francisco's leading outbound shipments have been canned and dried fruits, refined sugar, ores of metals, products of petroleum,

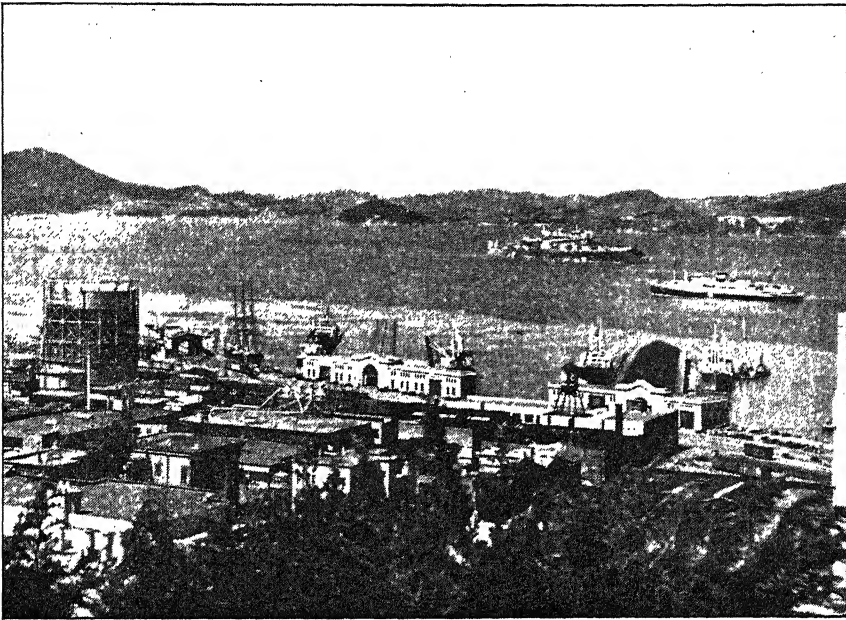


Photo by James Sawders

The harbor of San Francisco. If this view were more extensive, one would see at the left the bridge across the Golden Gate and at the right the bridge to Oakland.

and lumber. Cargoes entering the harbor before the war included canned pineapples and raw sugar from the Hawaiian Islands, vegetable oils from China and the Philippines, and lumber from North Pacific ports. The city is a distributing center for fertilizers, lumber, and manufactured articles to the farming sections of California and adjacent states.

Los Angeles—an inland port. The harbor of Los Angeles at San Pedro is 20 miles from the heart of the city. To provide themselves with water front, the citizens purchased a strip of land one fourth of a mile wide extending to the Pacific Coast. Thus the leading city of Southern California became a seaport. It is now the chief commercial city of that part of the state. Los Angeles is near extensive oil fields and is in the midst of a great fruit and vegetable region. It formerly shipped petroleum products in great quantities to all parts of the world. Fruits—fresh, canned, and dried—are sent to all parts of the United States. The leading commodities received by water have been crude oil, lumber, equipment for the oil fields, and fertilizers. The motion-picture industry of the Hollywood district has aided in the growth of the city and has added to the commerce of its port. (See illustrations on pp. 82 and 184.)

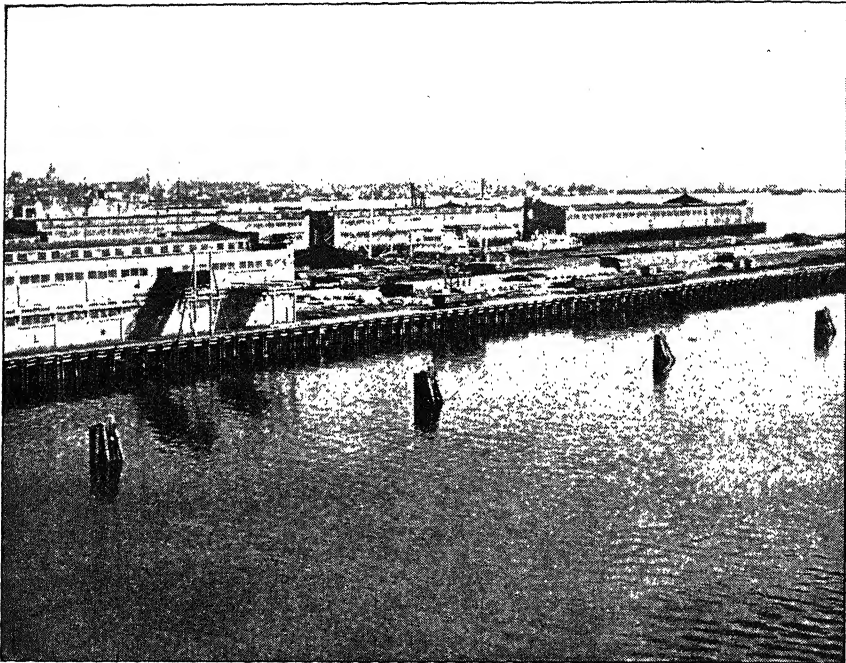


Photo by James Sawders

The docks of Seattle with the city in the background. Seattle is primarily a commercial city. With what parts of the world is it connected by water routes? By railways?

San Diego. This city has a first-class harbor on the southernmost shores of California. Its latitude and its location near the sea protect it from the heat of the summer and the low temperatures of winter. Its mild climate, like that of much of southern California, makes the region a favorite health resort. The Federal Government uses this port as a base for many of its activities. Here are located the largest naval base on the Pacific Coast and aviation schools for both the Army and the Navy. Airplanes, airplane motors, and other equipment are manufactured here. The commerce of the port has been largely coastwise.

Seattle. This is the leading port of Puget Sound. Seattle is located between the sound and Lake Washington, which is connected with the sound by a canal. Thus the port has an extensive water front, a part bordering the salt water of the sound and the rest the fresh water of the lake. It lies in a region rich in forests and fisheries. Its location favors trade with Alaska, with the Far East, and with Pacific ports to the south. Outbound shipments consisted largely of lumber, wheat and flour, canned fish, apples, and other fruits. Among

the goods received were the products of Alaska; lumber and newsprint from Canada. Silk, soybeans, bean oil, canned fish, and other products used to be imported from the Far East; burlap and bagging from British India; and sugar from the Hawaiian Islands. Seattle is in the midst of a region having an abundant supply of hydroelectric power. The manufacture of paper is one of Washington's leading and rapidly growing industries.

Tacoma. This city is the center of a great lumber and paper industry. Before the war it shipped more lumber products than any other of our ports. Tacoma has one of the largest copper smelters in the country.

Great crossroads of our country. Thus far we have learned something of the gateways of our coasts. These gateways, or ports, aid in the shipment of goods from one part to another of our own country; they also lead out to the ports of all other continents. We shall next study very briefly a few cities which have grown up at what may be called *great crossroads*. Country towns and villages often grow up where the main roads cross. There we find the country store, the post office, and perhaps the school and the church. People find it convenient to have their homes near such a center and so the town grows.

In a similar way great cities are situated in places convenient to communication with other parts of the country. They can easily get the goods that they need, and they can as easily send their products to other markets. Some of these cities developed on the shores of lakes, such as Buffalo, Chicago, and Cleveland. Others, like St. Louis, grew up where river routes converge. Still others, like Denver, are located near mountain passes which were crossed by early trails and later by the railroads. We can give space only to a few of the most important ones. You will find it interesting and profitable to study as many others as you can. Especially interesting will it be to study air-line maps to discover new crossroads.

Chicago. This city is, next to New York, the largest city of the United States. It has made a marvelous growth from its settlement about a hundred years ago to a great industrial and commercial center with an estimated population of more than 3,500,000. An inland city could hardly have greater advantages. Its location at the southern tip of Lake Michigan permits communication by water with all the states bordering the Great Lakes. Lying in the center of a great plain making easy the construction of railways, it has become the greatest railway center of the world. It is also the center of the

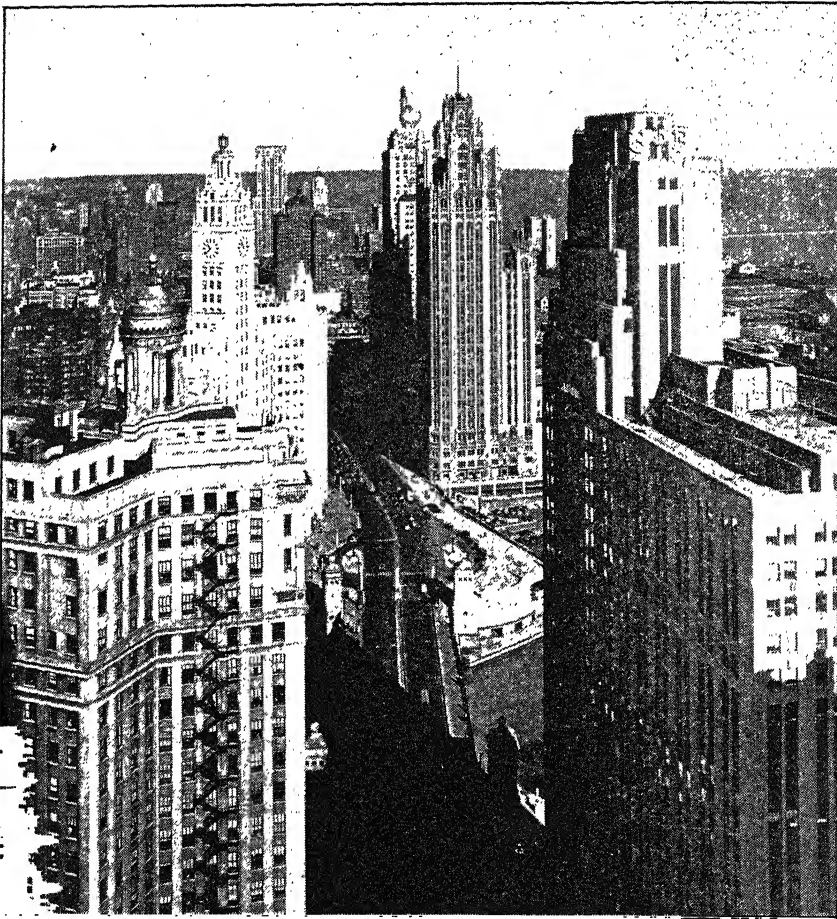


Photo by Kaufmann-Fabry Co. from James Sawders

Michigan Avenue, Chicago. This is the second city in size in the country. Its great wealth is due mainly to the great extent of grain and cattle lands of which it is the center. Moreover it is readily accessible to vast iron deposits and coal fields. How does its location on Lake Michigan help?

major airway lines of the country and has no less than twenty permanent airports.

The resources of the great region of which Chicago is the center are almost unlimited. It is in the heart of one of the most extensive wheat, corn, and cattle areas in the world. Bordering the shores of Lake Superior are rich deposits of iron and copper and not far away in Pennsylvania and West Virginia are the country's greatest deposits of bituminous coal. Smaller deposits of coal are to be reached in Illinois itself and other neighboring states. During its period of rapid growth Chicago was able to draw upon the great forest reserves of

the Great Lakes Region for lumber; but these are now approaching exhaustion.

Such resources have made Chicago a great industrial center. Among its leading industries are meat packing, flour milling, and the manufacture of farm machinery, railway equipment, and other products of iron and steel. These products have a wide distribution. If the Great Lakes to Ocean Waterway should be completed so that large ocean-going steamers could reach Chicago, no doubt the commerce of that port would be much greater than it has ever been.

At the present time ships drawing not more than fourteen feet of water can pass up the St. Lawrence above Montreal. In the past small ocean-going vessels from Germany, Norway, and the Netherlands reached the harbors of Chicago, Cleveland, and Detroit. The ships of one Norwegian company sailed regularly between European countries and ports on the Great Lakes.

St. Louis. This river port is on the western side of the Mississippi River about twenty miles south of the mouth of the Missouri and one hundred twenty-five miles upstream from the mouth of the Ohio. Thus, in the early days of exploration and settlement, St. Louis was the one center connecting with all three river valleys. For this reason it early became a fur-trading center. Trading in furs and the preparation of skins have continued until today St. Louis is one of the leading fur-trading centers of the world. In other respects its resources and industries are much like those of Chicago. Among its great industries are meat packing, flour milling, and the manufacture of hardware and shoes. It is second only to Chicago as the country's leading railroad center.

Because Missouri leads all other states in the production of lead, St. Louis stands high in the production of white lead, which is used in making paints. It also manufactures supplies for plumbers and steam fitters. Just across the river in Illinois is East St. Louis, an important manufacturing center.

Kansas City. This city in Missouri is closely associated both industrially and geographically with Kansas City, Kansas. These two with North Kansas, Independence, and smaller suburbs make up Greater Kansas City with a population of more than 650,000. In early days this area was the head of water transportation on the Missouri River. Thus it became a terminus for both water and land routes. For more than a hundred years this section has been a distributing point for goods to the great Southwest over the Santa Fe Trail and later by means of the railroads. Kansas City is the center



McLaughlin Air Service from Curtiss-Wright

Airplane view of Kansas City showing some of the many bridges spanning the Missouri River

of a great grain and cattle region. It leads all other cities as a winter-wheat market and as a point of distribution of agricultural implements. It is also the chief market for *feeder cattle*; that is, cattle are brought here from the ranches of the plains and sold to farmers of the Corn Belt for fattening. As a livestock center Kansas City is second only to Chicago. The milling of flour and the distribution of seeds to farmers are important activities.

Denver—a mile-high city. This city is located on the western edge of the Great Plains near the foothills of the Rocky Mountains and about a mile above sea level. The city is only eighty-five years old having begun its existence as a mining town about 1858. Forty-miners on their way to California found gold in the stream gravels near Denver and settled there.

The city is surrounded by country having a great variety of resources. The Rocky Mountain region for which it is the chief distributing center supplies a variety of minerals. Agricultural and grazing lands extend over the Great Plains to the east and in sections of the mountain region to the west. Coal is mined in Colorado, and power is obtained from mountain streams.

Denver is an important manufacturer and distributor of supplies and equipment for mining camps throughout the mountain region.



Photo by James Sawyers

A view of the city of Denver, Colorado. Notice the even skyline or horizon in the background. Denver is situated on the western margin of the Great Plains. The level surface of these plains is shown in the background.

Other leading industries are meat packing, flour milling, and the manufacture and repair of railroad equipment. The Moffat tunnel puts Denver on a direct route across the country.

GUIDES TO STUDY

1. What ports of the United States are not discussed in the preceding section of the text? For what is each important?
2. What advantages has Boston over other New England ports?
3. Why is the commerce of New York greater than that of any other port?
4. How does nearness to coal fields aid the industries and trade of Philadelphia and Baltimore?
5. What are the leading exports of the South Atlantic ports? Why?
6. How would you expect the export trade of New Orleans to differ from that of Galveston and Houston?
7. What advantage has San Francisco over other ports of the Pacific Coast?
8. Why is the commerce of the Pacific Coast of the United States much less than that of the Atlantic Coast?
9. In what sense may Chicago, St. Louis, Kansas City, and Denver be considered as crossroads? What other factors determined their location?

10. What products used in your neighborhood may have been distributed from Chicago? Why?

11. What industries of Chicago are benefited by the water transportation of the Great Lakes?

TOPICS FOR CLASS DISCUSSION

1. Contrast ports of the east coast with those of the west coast.
2. Contrast the trade of the two coasts.
3. New York, our largest port.
4. Advantages and disadvantages of an inland city.
5. Effect of the airplane on the development of cities.

WORK TO BE DONE

1. On an outline map of the United States locate with dot and printed name all the cities mentioned in the foregoing section. Trace and draw steamer routes from New York to other large ports on the east, the south, and the west. Trace routes on the Great Lakes. Draw railway lines from New York to Albany, to Buffalo, to Chicago. Draw railway line from New York to Boston; also to Philadelphia, then to Pittsburgh, then to Chicago, then to Denver, Salt Lake City, and San Francisco. Draw other main railway lines connecting the chief cities at crossroads.

2. Contrast the products passing through Atlantic ports with those passing through Gulf and Pacific ports and account for differences.

3. Examine and collect advertisements from newspapers and magazines to show some of the leading industries and products of our great cities.

4. Prepare a report to be given to the class on one or more of the following topics: (a) The settlement and growth of any one of our great cities; (b) Why New York has more trade with the Middle West than has Boston or Philadelphia; (c) Why the commerce of New York is greater than that of San Francisco.

5. Topic for debate: A good harbor is of more advantage to a port than a good hinterland.

6. Select one of the seaports discussed and describe its geographical location, the area it serves, its leading industries, and the chief products that pass through it as exports and imports.

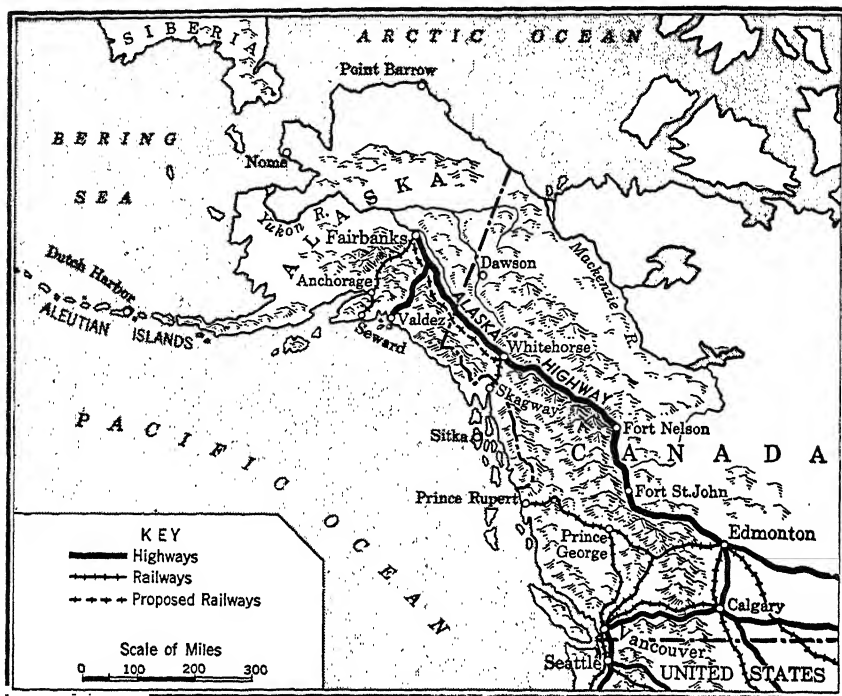
7. Make a study of Detroit, Cleveland, and Washington and then decide whether they should be considered as gateways or crossroads. Can the same city be both? How?

UNIT XIII. OUR DEPENDENCIES—NEAR AND FAR AWAY

Our far-flung domain. Our country is made up of forty-eight states and two territories which are not only united under a single government but with the exception of Alaska and Hawaii constitute a single land mass stretching from the Atlantic to the Pacific Ocean and from Canada to Mexico and the Gulf of Mexico. Besides this great land mass circumstances have led to the United States' possessing a number of smaller land tracts widely scattered through the world. These possessions of ours consist of the two territories of Alaska and Hawaii and the dependencies of the Philippine Islands, Puerto Rico, Guam, American Samoa (Tutuila, Manua, etc.), the Virgin Islands of the United States, other small islands, and the Canal Zone. Locate Alaska, Puerto Rico, the Canal Zone, the Philippine Islands, Guam, Midway Island, and the other possessions on your wall map.

How we acquired our dependencies. Alaska was acquired by purchase in 1867 for the sum of \$7,200,000. The Hawaiian Islands, under the leadership of Americans who had settled there, joined us by voluntary annexation in 1898. The Philippine Islands and Puerto Rico came under our control at the close of the Spanish-American War. Since that war was fought for the liberation of Cuba from the Spanish yoke and not for conquest of territory, there was considerable difference of opinion in this country as to the propriety of our taking possession of those two Spanish colonies. To ease our democratic conscience, we paid Spain \$20,000,000 for the relinquishment of all claims to the two colonies. We definitely annexed Puerto Rico but promised the Filipinos that, when they proved to us that they were capable of governing themselves, they should be given their freedom. For use as coal, naval, and cable stations we took possession of Samoa in 1889—by agreement with Great Britain and Germany; Wake in 1898; Guam in 1899; and Midway. Since 1903 the last has been a very important cable station.

In 1904, with the construction of the Panama Canal in view, we helped stir up a revolt in the province of Panama, a part of the Republic of Colombia. The province became a republic and in return for a lump sum of \$10,000,000 and an annuity of \$250,000 ceded for all time to the United States a strip of land across the isthmus—known to us as the Canal Zone. The Danish West Indies,

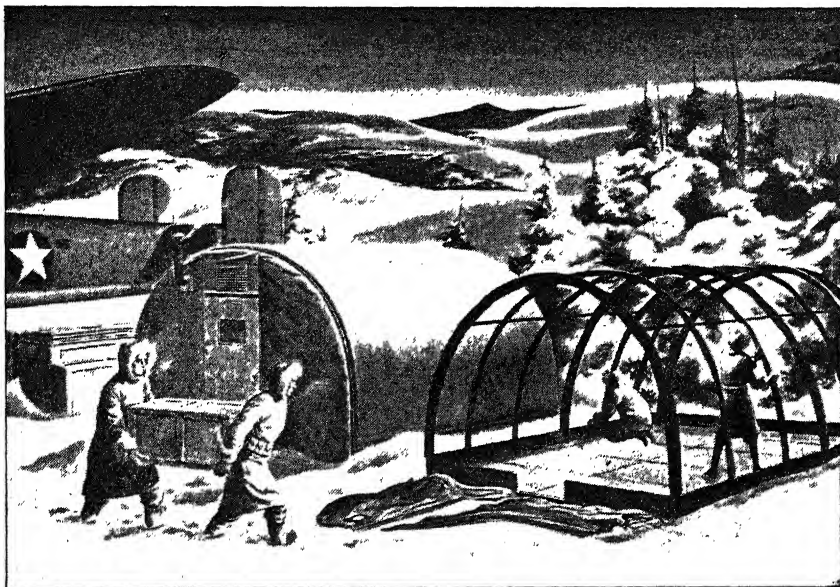


now the Virgin Islands, we bought outright from Denmark in 1917 for the sum of \$25,000,000. We wanted them for a coaling and oil-fueling station and a naval base. In 1936, when we began to realize the importance of oceanic island possessions as air bases, we placed Kure Island to the westward of Hawaii under the control of our Navy department.

ALASKA

Alaska—the crossroads of the north. Alaska was called by the late General William Mitchell “the most important strategic area in the world.” The occupation of two of the Aleutians by the Japanese brought home to us the truth of that statement. Concrete evidence of our acceptance of that truth is shown by the recent establishment in that territory of strong bases for ships, submarines, and planes, by the construction of the Alaska Military Highway, and by our relentless struggle to regain possession of Attu and Kiska Islands.

The Alaskan icebox. The wisdom of the purchase of Alaska by Secretary Seward was seriously questioned at the time by a majority of the American citizens. They looked upon it not only as a bad bargain but as a “gold brick” and in scorn and ridicule popularly referred to the region as “Seward’s icebox” or “Seward’s folly.” It



Courtesy Owens-Corning Fiberglas Corporation

Arctic shelters for the Army Air Forces; these shelters are so light and compact that they can be flown to bases where strategy demands airplane maintenance in this global war.

is true that one third of Alaska is north of the Arctic circle and that during the long, cold winters in some sections the temperature goes to 60° below zero. The rivers are frozen the greater part of the year, and there are icebergs off long stretches of the coast. Yet, thanks to the warm winds that blow from the Pacific Ocean portions of the south coast seldom register a temperature below zero and in the summer time the mercury soars to 80° . In parts of the interior where the winter temperature is 60° below zero, the summer temperature rises to 90° above zero, making a difference of one hundred fifty degrees. The rainfall is abundant. One of the most trying features of the climate is the density of the fog that envelops the region much of the time. It is said that the chief obstacle to the recovery of Attu from the Japanese was not that it was an island, not that it was mountainous, but rather because of its blanket of fog and its unpredictable weather.

The wealth of Alaska. With the passing of the years we have learned that Alaska was not a "gold brick," but that it is rather a brick of gold. By its purchase we acquired a tremendous area, over twice the size of Texas or about twelve times that of New York State. Its gold, copper, fur, timber, and fish have yielded hundreds

of millions of dollars to the United States. The population, made up of whites, Indians, and Eskimos, at the time of the last census (1940) was 72,524.

Wealth in fisheries. Fish are Alaska's most valuable product. For several years the value of the catch, chiefly salmon, was \$50,000,000 or more, more than five times the value of the annual yield of gold, silver, and copper. Canned salmon worth from \$30,000,000 to \$45,000,000 were sent into the markets of the world annually. Halibut in large numbers were frozen and shipped to all parts of the United States. Because of present war conditions the industry has declined somewhat and as a consequence there are fewer canneries in operation. Until the outbreak of war in the Pacific the Japs used to come to our western and Alaskan shores with their floating canneries to fish and can their catch right under our very noses. In the future our West Coast fishermen will probably never again be up against competition from that source.

Wealth in mines. From 1880 to the present time Alaska has produced gold, silver, and copper to the value of more than \$750,000,000. There is much coal, but not all of it is of good quality. Coal mining is expensive and so is not extensively developed. There is not enough coal produced to meet the needs of Alaska. In the future, however, coal and other valuable minerals may be extensively mined.

Wealth in forests and farming. Because of the heavy rainfall portions of Alaska are thickly forested. Some paper and pulp mills have been established. That is an industry that is bound to grow as our own forests are depleted. In some parts of the territory excellent crops can be raised. The season is short, but the summer days are long and the crops grow so quickly that it is almost possible to see them grow. The chief drawback to farming has been the lack of markets. Improved transportation will help solve that problem.

Wealth in furs. Another source of wealth is furs. Alaska is truly a hunter's paradise. The Pribilof Islands in the Bering Sea are the principal breeding grounds of the fur-bearing seal. To prevent extermination of these animals by open-ocean hunting, by which great numbers of mother seals were taken, our country made a treaty with Great Britain, Japan, and Russia in 1911 to regulate the taking of the seals. Even before the war Japan withdrew from this agreement. The United States now determines the conditions under which the male seals may be taken on the Pribilof Islands. These wise restrictions have saved the herd from destruction and have increased their number from 215,000 to nearly 1,500,000.



Photo by James Sawders

A fur trader's home in Alaska. The wild-life reserves of Alaska are valued at \$100,000,000. Not all the furs are obtained by hunting; fur farming is carried on extensively. There are more than 200 licensed fur farms on which are raised silver foxes, white foxes, mink, beaver, and other animals.

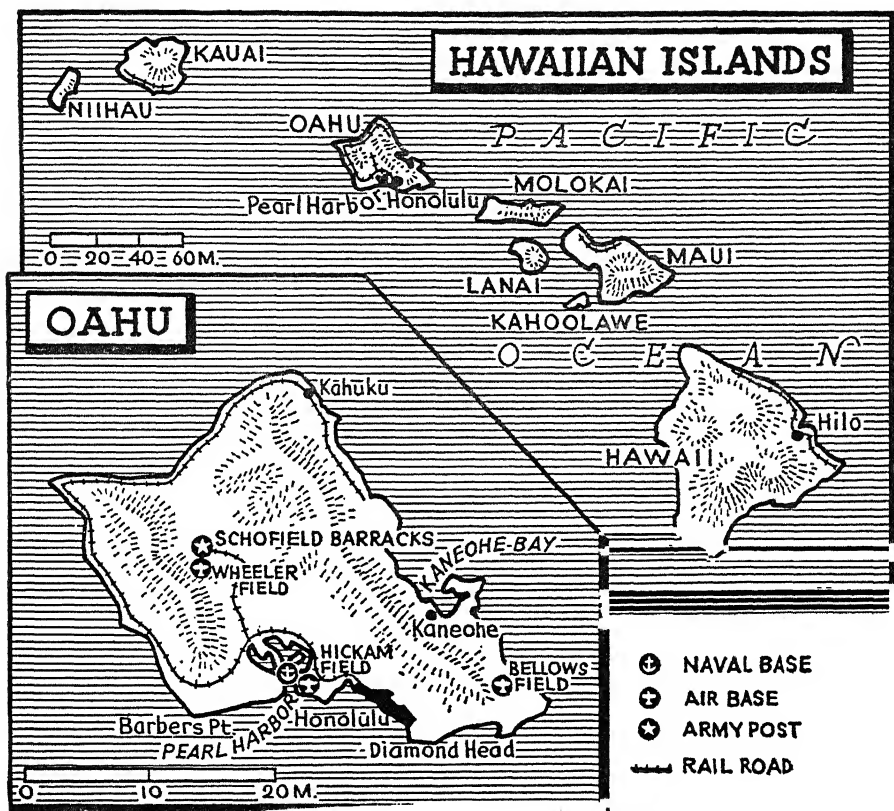
There are many valuable land fur-bearing animals in Alaska, such as the silver fox, mink, marten, muskrat, and beaver. Many of these are being raised in captivity; in fact, fur farming of mink and of blue silver foxes is becoming an important business.

Wealth in reindeer. In 1891 the United States imported into Alaska a small herd of ten animals and during the next ten years additional importations brought the number up to 1280. Lapps were brought in to teach the Eskimos how to care for these animals. In about thirty-five years this relatively small number had increased to more than 1,000,000. Reindeer live upon mosses and wild grasses. Even in severe winter weather they uncover the moss under the snow with their large hoofs and thus find food. The reindeer is a very important source of food and clothing. In 1941 about 24,000 animals were butchered for their flesh and hides. The meat is sold in some western and Canadian markets for human consumption and is an article that may find its way someday, canned or frozen, into our meat stores.

Wealth from tourists. One of Alaska's most enduring resources is its wealth of natural scenery. Here is Mt. McKinley, the highest mountain peak on the North American continent. The Yukon River offers a fascinating route through the interior. Salmon runs, where the fish fight their way up steep waterfalls to the upper reaches of the river, are breath-taking sights. Dazzling glaciers with huge masses of ice falling with a roar into a sapphire sea is a vision of power and beauty the tourist will remember forever. Alaskan cruises were very popular with the traveling public until the outbreak of the war. Henceforth we shall not be limited to cruises in our approach to Alaska. The new Alaska Military Highway will open up an automobile route, and the airplane will set us down on any one of its several airports. The global map shows, too, that Alaska is only a few hours by air from northern Europe and northern Asia. Polar flights may make of this northern possession a center of travel and transportation. In terms of air hours its distances from other centers are as follows:

Fairbanks to Seattle	5 hours 20 minutes
Fairbanks to Los Angeles	8 hours 40 minutes
Fairbanks to Iceland	10 hours 40 minutes
Fairbanks to Murmansk	10 hours 50 minutes
Fairbanks to Irkutsk	12 hours 20 minutes
Fairbanks to Shanghai	14 hours 30 minutes

Travel over land. We have already learned of the Alaska Military Highway and its importance (pp. 199 and 361). A similar road from Irkutsk across Siberia has been planned, having for its eastern terminus the western shore of Bering Strait. The same plan visualizes the extension of the Alaska Highway to the eastern shore of Bering Strait. When these two highways are completed, they will link the highways of the United States with those of Siberia and eventually with European Russia. In winter the strait can be crossed by air and in summer by ferry over the open water. It will then be possible to travel around the world by automobile or truck with the exception of the gap made by the Atlantic Ocean. This gap, like that of Bering Strait, can be filled by means of air transportation. Better means of communication both by air and by land are sure to make of Alaska a bulwark of defense and an important commercial center in times of peace.



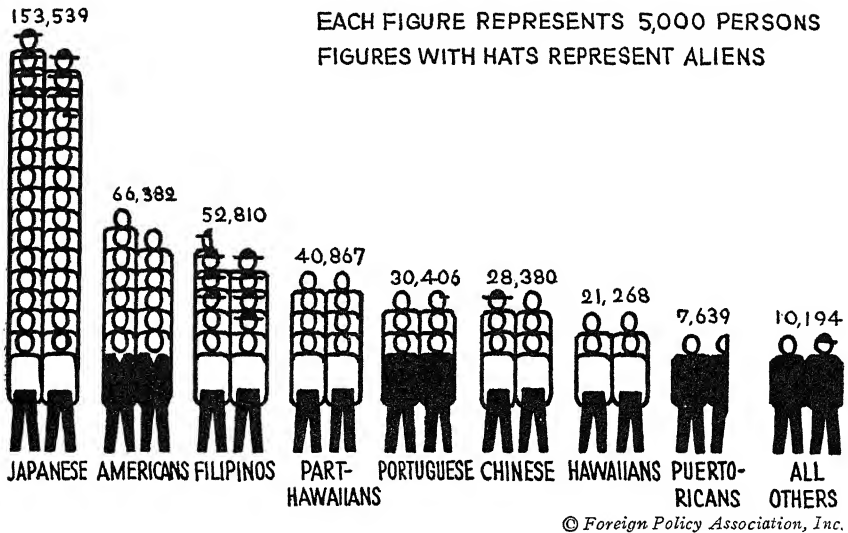
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HAWAII

At the crossroads of the Pacific. Like Alaska, Hawaii is a territory of the United States. As Alaska is our crossroad to the north, so Hawaii is our crossroad of the Pacific. The islands, twenty in number, lie just south of the tropic of Cancer, near the middle of the Pacific Ocean, 2000 miles from the nearest mainland. They are our most important Pacific outpost. Coaling and naval stations and submarine and airplane bases are located there. Before the war important steamship lines radiated from the islands to all the chief Pacific ports, both east and west. Overnight air service was maintained with our mainland and Henderson Field in Honolulu was the first stop for the trans-oceanic Pan-American clippers.

Climate and crops. The subtropical climate is as nearly ideal as that of any spot on earth. Although the humidity is often high, the Weather Bureau has never recorded a temperature above 88° nor

THE PEOPLE OF HAWAII—1938



below 56°. The northeast trade winds bring ample rainfall to the eastern slopes of the islands. The principal agricultural products are sugar and pineapples. Both are subtropical crops, but they do not encroach on each other because, while sugar cane does not grow to advantage above 1000 feet elevation, pineapples grow well up to 2000 feet. Nearly all the sugar is exported raw. The pineapples are canned as fruit or juice. Both crops have brought great wealth to the islands.

The people of Hawaii. When Captain Cook, an Englishman, visited the islands in 1778, they were inhabited by a population of about 200,000 half-savage natives, believed to belong to a branch of the Malay race. Quickly responding to the teachings of missionaries sent to the islands in 1843, they soon became Christianized. Their numbers however have been gradually decreasing, due largely to foreign diseases. In 1941 there were only 14,000 full-blooded Hawaiians and 52,000 part Hawaiians living on the islands. The industries of the islands are in the hands of white people, chiefly Americans, who are the influential class. They number a little more than 140,000. Because of the great demand for cheap labor on the plantations, Orientals, including Chinese, Japanese, Koreans, and Filipinos have flocked there in great numbers. So gradual and so subtle was the infiltration of the Japanese that at the outbreak of the

present hostilities 159,000 individuals of that race were living on the islands. The total population was 465,000.

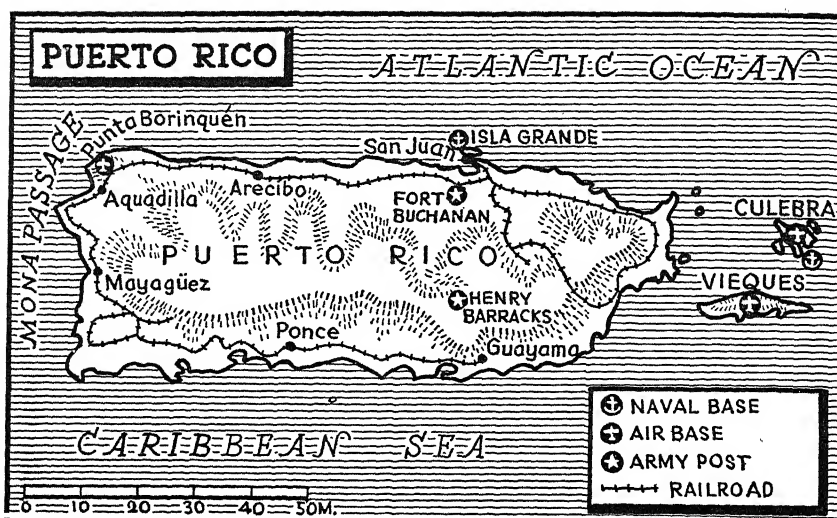
December 7, 1941. To the list of our memorable dates: Concord Bridge, April 19, 1775; Fort Sumter, April 12, 1861; and the Battleship Maine, February 15, 1898, is now added Pearl Harbor, December 7, 1941. At the sound of the first alert Hawaii flew to arms and has remained "at attention" ever since. Aliens were quickly rounded up, civilians not directly needed for war purposes were evacuated to the mainland, and the whole island economy put on a war basis. That is one reason why in this country sugar and canned pineapple were rationed. The defense of Hawaii comes first; our hold on the islands must not be loosed.

The capital. Honolulu, a quite modern city situated on the southern shore of the island of Oahu, is the capital and commercial center of the islands. It is an important trans-Pacific cable station, and is our most important naval, aviation, and submarine base in the Pacific.

Our other Pacific possessions. Midway Island, a unit of the Hawaiian Territory, is twelve hundred miles to the northwest of Hawaii. In addition to being an important cable relay station, it is an air base and a staunch outpost for Hawaii. Wake Island, almost directly west of Hawaii, is in the line of the direct sea route between Hawaii and Hong Kong. It is about halfway between Hawaii and Japan as well as halfway between Midway and Guam. Guam, about three thousand miles from Hawaii and only fourteen hundred miles from the Philippines, was the site of a powerful Government radio station. American Samoa about twenty-two hundred miles southwest of Hawaii is nearer New Zealand than it is to any other large body of land. A naval air base is located there. Guam and Wake fell into the hands of the Japanese in December, 1941. Midway was attacked again in June, 1942, but after a fierce two-day battle the enemy was driven off with heavy losses. It has been claimed that this battle was the turning point of the war with Japan.

PUERTO RICO

This is one of the most beautiful and fertile islands of the West Indies. It was acquired by the United States in 1898 as a result of the Spanish-American War. It lies nearly five hundred miles east of Cuba and about fifty miles east of Hispaniola. Its area is about one



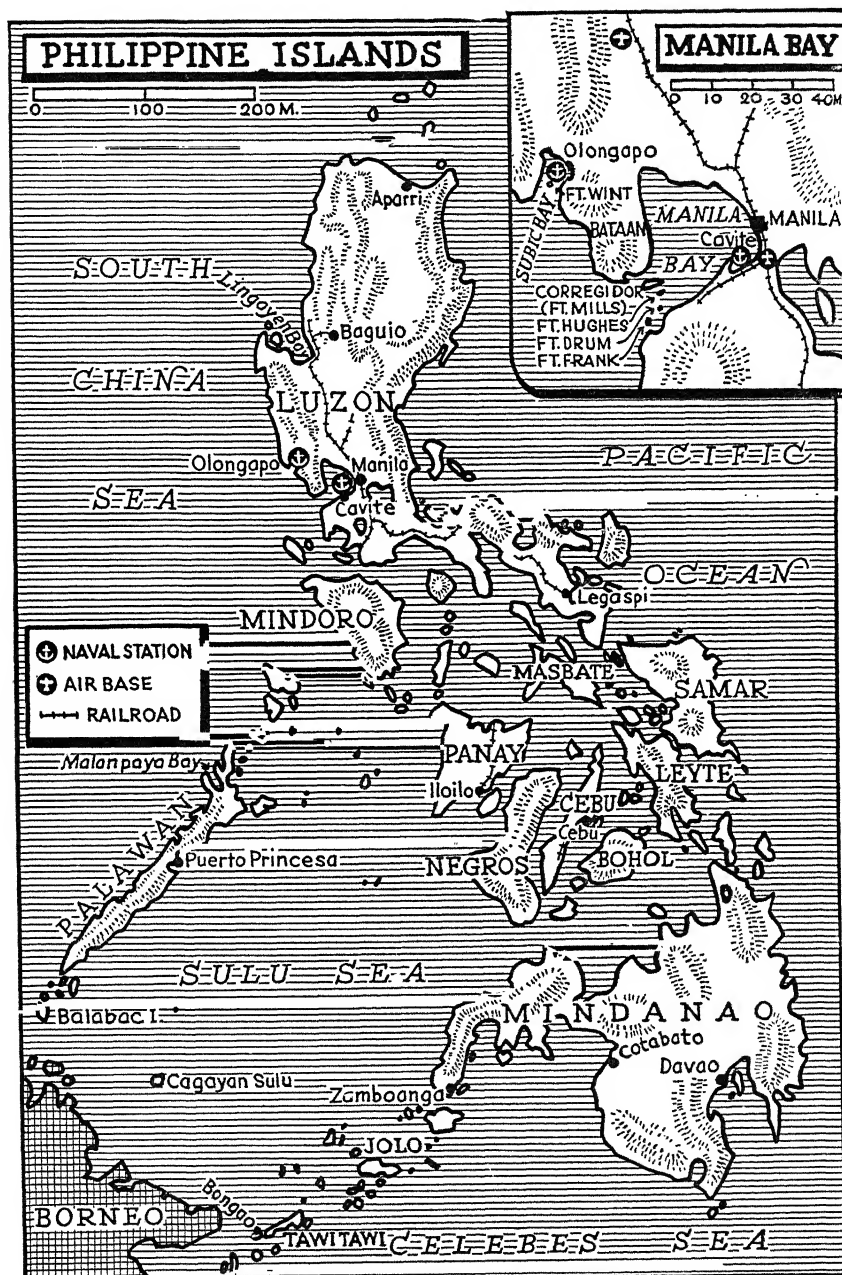
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twelfth that of Cuba. The population is a little more than 1,869,000 with an average of 540 to the square mile. This is somewhat too crowded for an agricultural country and has resulted in political and social unrest. Conditions have been aggravated by the submarine menace to shipping and the consequent lack of trade between the island and continental United States. Nearly three fourths of the people belong to the white race; the remainder are Negroes or of mixed blood. Since coming under control of the United States, Puerto Rico has made rapid material progress, and illiteracy is being rapidly reduced under the excellent school system established by our Government. The governor of Puerto Rico is a continental American. The Puerto Ricans have held citizenship since 1917. The demand for full statehood is growing.

A mountain range extends from east to west through the island with the mountains generally cultivated to their summits. Since the island lies in the belt of the northeast trade winds, the north side has abundant rains while the south side needs some irrigation for crop and fruit production.

Puerto Rico lies in the dangerous hurricane belt. In 1928 a severe hurricane killed 271 people and injured more than 3000. Many of the crops, fruit trees, and buildings were destroyed or greatly damaged. Four years later another destructive hurricane visited the island.

The leading products are sugar, tobacco, citrus fruits, and coffee.



In normal times nearly all the Puerto Rican exports find a ready market in the United States. A large part of the coffee was formerly reshipped from the United States to Europe. Grapefruit production is rapidly growing and canned grapefruit has been sent to the United States in increasing quantities. The island imports grains and cereal products, cotton goods, manufactured iron and steel, and meat products.

THE PHILIPPINES

How near are the Philippines to us. The Philippine Islands, on the other side of the world from us, touch our lives more closely than many realize. Sugar was rationed in our homes partly because the occupation of the islands by the Japanese and the problems of transportation keep from our shores the one million tons of sugar which normally came to us from our Far Eastern possession. Before the war great quantities of coconut oil and copra, the dried fruit of the coconut, came to us from the Philippines. It is because these products no longer reach us that we are obliged to save fats and to use less margarine, a main constituent of which is coconut oil.

Another product for which we relied wholly upon the Philippines is Manila hemp. Today this commodity is so scarce that dealers are not permitted to sell any of the small stock on hand without permission of the Federal Government. Manila hemp is one of the very best fibers for making rope. If you have visited the docks at any of our large ports, you have certainly seen the great Manila hemp hawsers which are used to moor ships to the docks. Another important use of Manila fiber is for binding sheaves of wheat before they are thrown from the reapers in the grain fields.

The Philippines themselves. The archipelago lies southeast of China and consists of a group of seven thousand islands, the largest of which are Luzon and Mindanao. About four hundred sixty of the islands have an area of one square mile or more. If placed over the Americas the Philippines would extend from the southern limits of Cuba to northern Ecuador. Consequently the climate is tropical. The rainfall is especially heavy from July to November. The hot, moist climate and rich volcanic soil are well adapted to the growing of rice, the leading crop of the islands. Rice seems to have been the principal food of the people from time immemorial. The mountain slopes are covered with terraced rice fields almost to their very summits.

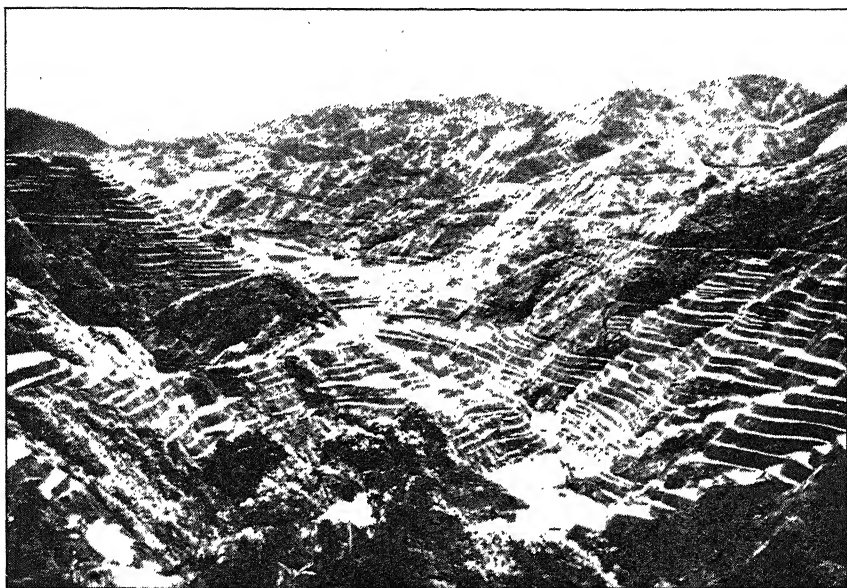


Photo by James Sawders

Rice terraces cover the sides of this valley in the island of Luzon. Such terraces have been in use beyond the memory and the records of man. They stand as a monument to patient human labor.

The Filipinos. When the islands came into our possession, many of the inhabitants were but half-civilized. The islands were densely populated, mostly by people of the Malay race. In 1940 they had a population of 16,356,000. The United States greatly helped the condition of the Filipinos. Their health was improved, their industries developed, and their government stabilized. Best of all was the establishment of public schools patterned after our own educational system.

The Filipinos are promised their freedom. When the islands were acquired, it was with the understanding that they were to be held only until the people were able to govern themselves. For years Congress debated the question of their release. The islands gave us a sphere of influence in a part of the world where we had large commercial interests. They provided naval bases and airports and served as a source of many needed products. On the other hand, so long as they were really a part of the United States, products of the islands came to the United States free of tariff charges and therefore competed keenly with some of our products.

Philippine products which compete with American products. Sugar from the Philippines, so long as it came to us duty free, com-

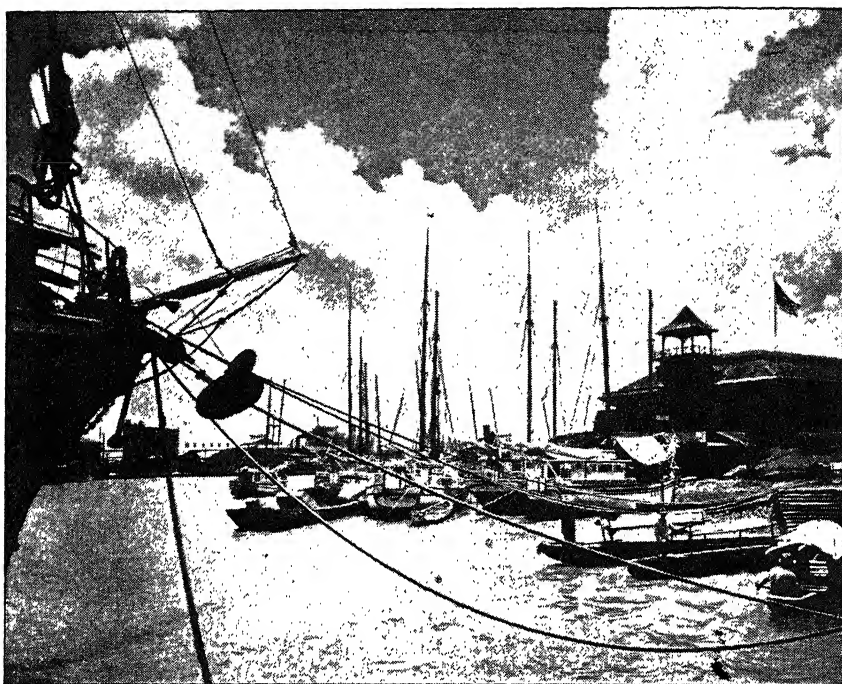


Photo by James Sawders

Island of Luzon, Philippine Islands. Boats in a harbor on the Pasig River before the seizure by Japan. What products did the large American steamer at the left probably take away with her?

peted with the cane-sugar growers of Louisiana and the beet-sugar farmers of states farther north and west. Copra and coconut oil competed with the cottonseed oil and peanut oil produced in our Southern States. Manila hemp competed with cotton in the manufacture of twine and cord. Tobacco growers in a number of states also felt the competition of Philippine-grown tobacco.

A provisional government is set up. For these and other reasons Congress passed a bill in 1934 providing for the freedom of the islands in 1946. In the meantime the islands were to form a government of their own under the guidance of the United States. General Douglas MacArthur, at the request of President Quezon, was appointed military adviser of the Philippines. The United States agreed to retain military bases in the islands.

The islands fall to the Japanese. When the Japanese attacked Pearl Harbor, they made a simultaneous attack on the Philippines. A few days later they landed on the island of Luzon. The main defense by American and Filipino troops was made on the Bataan Peninsula. The final stand took place at the Fortress of Corregidor.

The defeat of our men was due largely to a lack of fighting planes. It has been said, however, that one of the greatest needs of the malaria-stricken men was quinine. The Philippines have been brought close to our people, because they have been defended to the death by sons, brothers, and others from all parts of our country. No higher bravery was ever shown than in the fox holes of Bataan. Early in 1945 General MacArthur made good his promise to return when he recaptured Manila and the principal islands and restored civil government in the hands of President Osmeña.

GUIDES TO STUDY

1. Name the territories and dependencies of the United States and state how each was acquired.
2. Has the purchase of Alaska been justified? Give your reasons. How can its resources be made more useful?
3. Why can Alaska support many reindeer? How are these animals useful to the people of Alaska? How may they become commercially important?
4. Describe the climate of Alaska. How large is this territory? What is its population?
5. What does Alaska offer the tourist?
6. Why is Alaska likely to become an important aviation center?
7. Why may we consider the Hawaiian Islands a valuable territory?
8. In what ways is the climate of Hawaii adapted to the production of sugar and pineapples?
9. What are the advantages to the United States in having Puerto Rico under its control?
10. What have the Japanese to gain by the acquisition of the Philippines?

TOPICS FOR CLASS DISCUSSION

1. The value to the United States of its dependencies.
2. The future of Alaska.
3. The new highway to Alaska.
4. Hawaii, the crossroads of the Pacific.
5. Shall we be better off without the Philippines?
6. How have the Filipinos been prepared for independence?

WORK TO BE DONE

1. Why was the Matanuska Colony established by the Federal Government in Alaska?
2. Show how the products of the Philippines have competed with those of the American farmer.
3. Appoint a committee to learn the facts and then decide whether or not it was wise for our Government to arrange for the independence of the Philippines in 1934; in 1943.
4. On an outline map of the world locate each of our dependencies. Draw lines showing routes connecting each with the United States. List the ways in which these possessions aid our commerce.

UNIT XIV. OUTPOSTS OF THE UNITED STATES GUARD SEAS AND SHORES

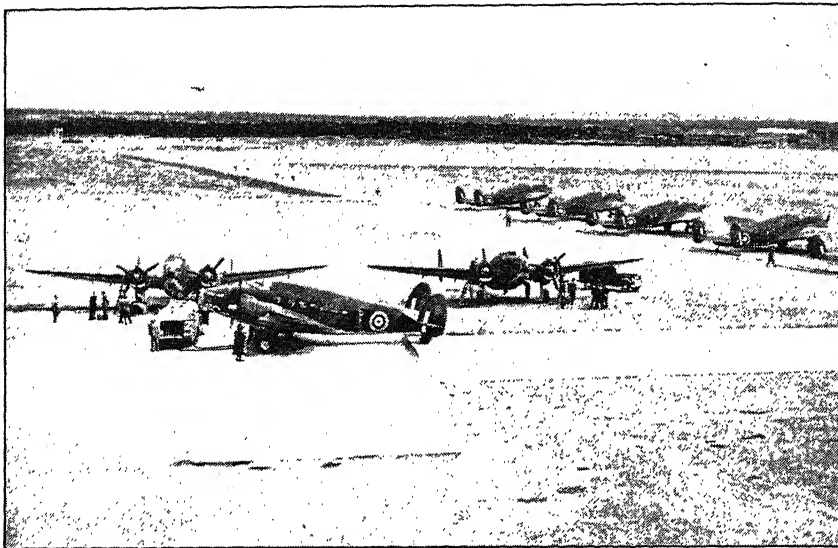


Photo by James Sawders

Our first stepping stone is Newfoundland. Here we have built aircraft bases and have set up antiaircraft defenses. The Ferry Command refuels here when en route to England.

Our ocean barriers. Until recently it was assumed that the Atlantic and Pacific Oceans constituted almost impregnable barriers against successful invasion of the United States by European or Asiatic enemies. From New England to France there are 3000 miles of ocean water. From California to Japan the distance is more than 6000 miles. These are enormous distances for ordinary ship-borne invading armies to traverse. Naval power and coastal defenses have always been thought sufficient to repel any such invasions.

But the rapid development of air power and the increased menace of the long-range submarine have completely changed our ideas concerning these ocean barriers. Not only our merchant ships, but our naval fleets as well are now vulnerable to attack by land and carrier-based planes and by submarine packs. It is the double danger of these two modern means of attack which have led to the need of American outposts in both the Atlantic and the Pacific. We need these outposts for three reasons: (1) to protect our shipping; (2) to protect our coast lines; and (3) to protect the Panama Canal. In order to see how necessary American outposts are for these three

reasons, let us consider first the Atlantic Ocean as it enters into our plans for defense.

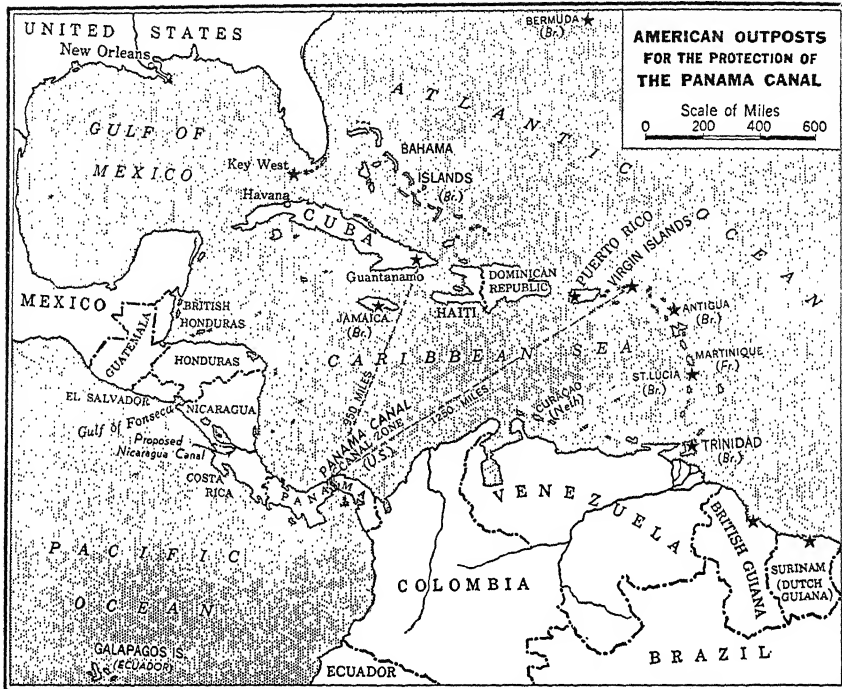
Atlantic outposts. In the North Atlantic there are obvious stepping-stones from North America to Europe. Starting from Newfoundland it is roughly 800 miles to Greenland, 500 more to Iceland, and 800 to Norway. It is easy to see that air bases in Iceland and Greenland would make it easy to reach Newfoundland, and from them the Canadian mainland would be an easy step. That is why we have gone into Newfoundland, Greenland, and Iceland to establish airfields and antiaircraft defenses. So long as these bases are in our hands, we can block any attempts to reach North America by this northern route.

These subarctic fields are also useful as home bases for planes to be used in protecting merchant convoys and in fighting enemy submarines.

In the South Atlantic the problems of defense are even more complex. From Dakar in West Africa to Brazil is only 1700 miles, a distance easily spanned by modern war planes. It is therefore important for us to have bases as far out in the South Atlantic as possible in order to guard against air attack by this southern route. Such bases also help in the ceaseless fight against the submarines operating in these southern seas. But their main value lies in the protection they afford to the Panama Canal. Some of our South Atlantic bases are used mainly for antisubmarine operations; but their most important value is the protection of the approaches to the canal.

From the start it has been realized that this life line between the Atlantic and the Pacific must be guarded against any possible attack. Naval and air bases are located at both ends of the canal, and the whole Canal Zone is well fortified. Many small islands near the coast are also fortified. But the long range character of modern air warfare makes it imperative to protect the ocean approaches to the Panama Canal. To do this on the Atlantic side, it has been necessary for the United States to acquire a large number of Caribbean outposts.

Two of these strategic bases we have had for over forty years. At the close of the war with Spain we acquired full possession of the island of Puerto Rico and the use of Guantanamo Bay in Cuba. Then in 1917, the United States bought from Denmark the Virgin Islands of St. Croix, St. Thomas, and St. John. But, with the approach of World War II, it was seen that we must occupy many more Caribbean islands in order to protect fully the gateways to the Panama Canal. As a result of this, we now have a network of out-



Potential danger from Guadeloupe and Martinique was ended where these islands surrendered to the Free French.

posts extending from British and Dutch Guiana on the South American mainland to the Bermuda Islands, far out in the Atlantic. A brief account of our many South Atlantic outposts follows: Located about 500 miles east of Cuba, Puerto Rico is a vital part of our Caribbean defenses. There is a great air field near the town of Aquadilla, which guards Mona Passage, between Puerto Rico and Hispaniola. There is also a naval base at San Juan, the capital. Vieques Sound, at the eastern end of the island, is being developed as a great naval anchorage. Numerous other sites are being equipped as defense units.

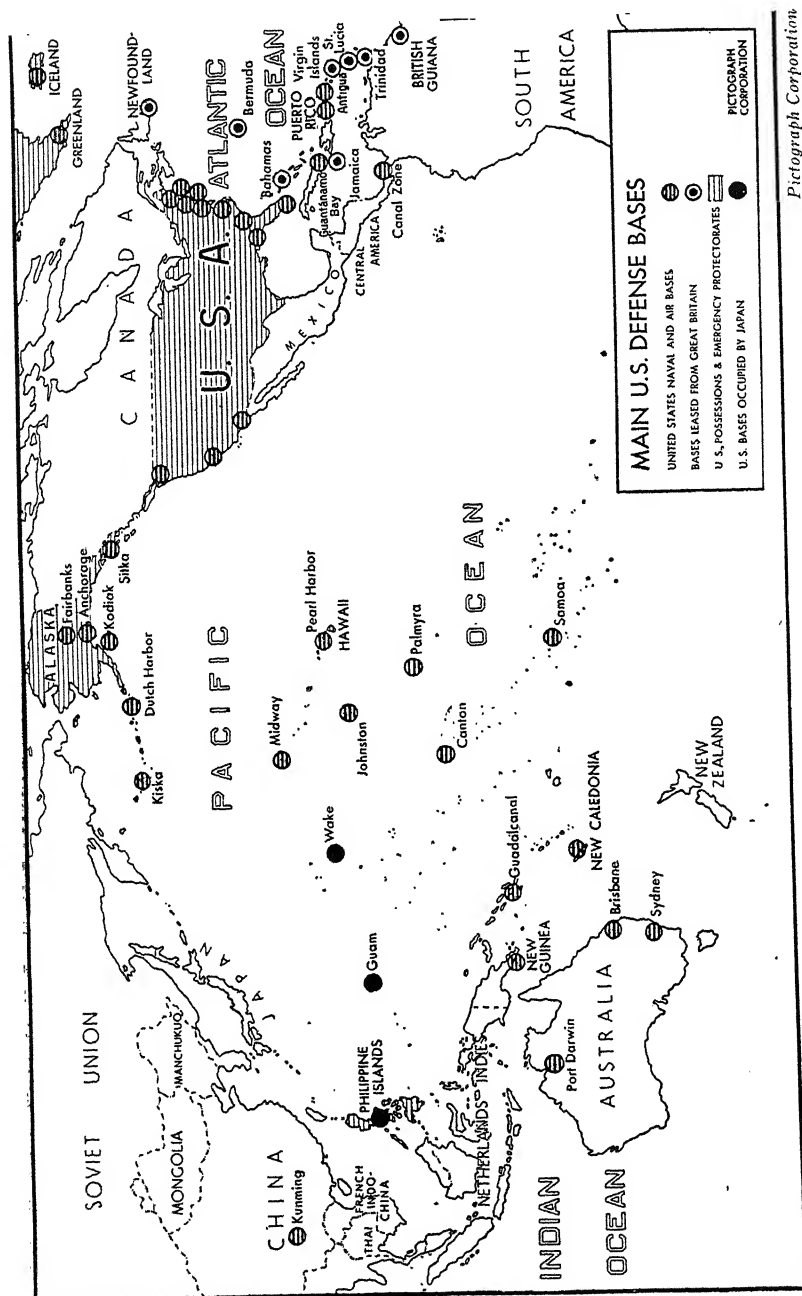
Guantanamo Bay, at the eastern end of Cuba, is close to the Windward Passage, between Cuba and Haiti. It is so near the mainland of Florida that it is easy to equip and supply. The Virgin Islands form the eastern part of our defense of the passage between these islands and Puerto Rico. There are naval and air bases on all these islands. Antigua is one of the Lesser Antilles, which form a sort of picket fence between the open ocean and the Caribbean Sea. It lies between the American Virgins and French Guadeloupe, an

essential point for defense. Parham Sound, on the northern shore, has a great seaplane base; which aids greatly in the patrolling of the surrounding passages against submarine invasion. The Antigua base, with those in the Bahamas, in Jamaica, St. Lucia, Trinidad, and British Guiana were all leased to us by Great Britain in return for the fifty over-age destroyers we gave that country in 1941.

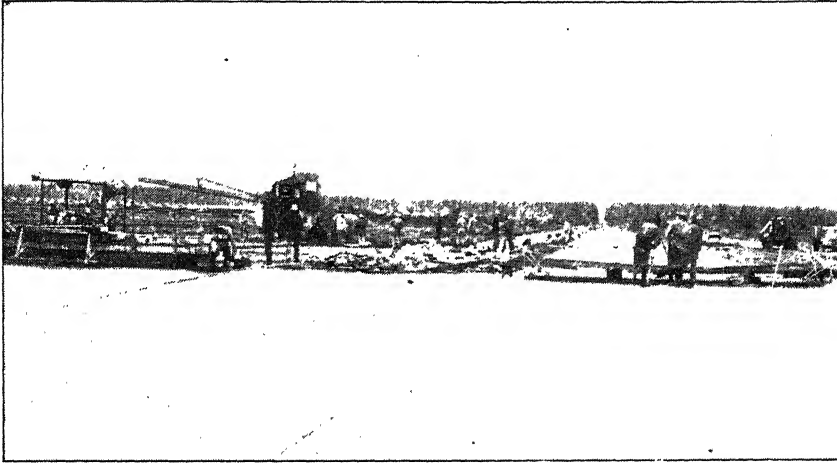
St. Lucia, twice as large as Antigua, is about 200 miles south of that island. Gros Islet Bay is reported to be the best deep-water anchorage in that part of the Antilles. This island gives us control over a large number of narrow sea lanes into the Caribbean. Authorities say that St. Lucia is the best available site for bases between there and Trinidad. Trinidad is the largest and most important island in our line of Caribbean defenses. The island is also important for its oil resources and its position so near the South American mainland. The Gulf of Paria, on the west side of the island, is well protected, deep, and large enough to accommodate an entire naval fleet. The United States has acquired a large area commanding this gulf, where air and naval bases are located. From other bases in the interior land-based planes can easily protect the northeast coast of South America. Other holdings in Trinidad command the passages between Trinidad and South America. Trinidad is a cornerstone of our Caribbean defense system. It guards a vital passage to the great refineries of Aruba and Curaçao. It lies outside the belt of tropical hurricanes; and it has abundant oil to refuel both planes and ships.

Our British Guiana base was also a part of the "over-age destroyer" trade; it is useful as a protection against any invasion of near-by Brazil. Dutch Guiana, or Surinam, has valuable bauxite mines, which are now protected by American troops. Inside this crescent of Caribbean bases is Jamaica, where we have several bases, also granted to us in return for our destroyers. These bases are important in their relation to the canal. Far out beyond the Antilles lies Bermuda, a mid-ocean link between the United States and Europe. Our naval and air bases there are our first line of defense against attack by planes or submarines.

Pacific outposts. Beyond the Galapagos and the Cocos Islands, there are no available island bases until we reach Hawaii. The Galapagos and Cocos have not been neglected; and other defense centers have been secured on the coasts of Colombia and Mexico. The center of our Pacific defenses is still at Hawaii, so nearly lost by the Pearl Harbor attack. Our position there has been immensely strengthened; and the lessons learned at Pearl Harbor will undoubt-



Defense bases must be capable of becoming bases for offense as well.



Courtesy Caterpillar Tractor Company

Pouring concrete on a long runway extension of an Alaskan landing field. The strategic position of Alaska makes large air bases for the army necessary.

edly prevent any similar disaster in the future. There are certain strategic weaknesses in Hawaii. One is the insufficient food supply, since the islands normally import more than half of their staple foods. This makes it necessary to keep supply lines constantly open to the west coast of the United States. Another possible danger is the fact that over a third of the Hawaiian population is of Japanese descent. But both of these weaknesses can be controlled with proper watchfulness. Pearl Harbor and its surrounding defenses can be and are being made impregnable. Located 2000 miles west of California, Hawaii is the pivot of the defense triangle which extends to Samoa on the southwest and the Aleutians on the northwest. At Pago Pago in Tutuila and at other scattered small islands we are developing naval and air bases. On the long outer leg of the Pacific triangle are Guam, Midway, Wake, and some other smaller islands. Guam is the farthest west, and its loss late in 1941 was a serious blow to our Pacific defense. The possession and strong fortification of these islands are vital to the security of our western coast and the protection of the Panama Canal.

Alaska was long neglected by our military policy makers; but we now have strong naval and air bases in the Andreanofs and at Dutch Harbor. From these points repeated bombings of the Japs on Kiska took place. This island along with Attu the Japs seized early in the war. Attu was the first to be recovered, and the entire occupying force of Japs was slain. Kiska was later found abandoned. There are also strong installations on the mainland at Fairbanks and Anchor-

age as well as at Sitka which is situated on an island near the coast. Also to be recalled is the new Alaska Military Highway, a truck road connecting Edmonton, Canada, with Fairbanks, Alaska. This will insure safe transport of supplies and equipment to our Alaskan outposts.

Last to be mentioned here are the Philippines, unfortunately taken by the Japanese, but destined to be again our farthest Pacific outpost. With proper supplies, equipment, and manpower these islands should never have been lost. In the fall of 1944 our forces under General MacArthur made a successful landing on the island of Leyte, thus beginning his reconquest of the archipelago. Before the winter's end Bataan and Corregidor were again in American hands.

GUIDES TO STUDY

1. Why are our bordering oceans no longer barriers?
2. Why do we need outposts in the Atlantic? In the Caribbean? In the Pacific?
3. How did we acquire each of our new outposts?
4. Why may Hawaii be considered the center of our Pacific defenses? What are the weaknesses of its location?
5. How has Alaska been strengthened as an outpost of defense?
6. The Japanese claim to have granted the Filipinos their independence. Why?

TOPICS FOR CLASS DISCUSSION

1. The chief purposes of our outposts.
2. Should the United States seek permanent possession of the outposts belonging to other nations?
3. Should the United States fortify all its island possessions?
4. Is statehood or independence for Puerto Rico our best policy in the future?

WORK TO BE DONE

1. On an outline map of the world locate as many of our outposts as you can. Decide as best you can how each of them aids in our defense.
2. Find out which of our island possessions are temporarily under the control of the Japanese.
3. List the islands surrounding the Caribbean Sea that belong to foreign countries and show to which country each belongs.

PART THREE. THE OTHER AMERICAS

UNIT XV. FRIENDLY NEIGHBORS NORTH AND SOUTH

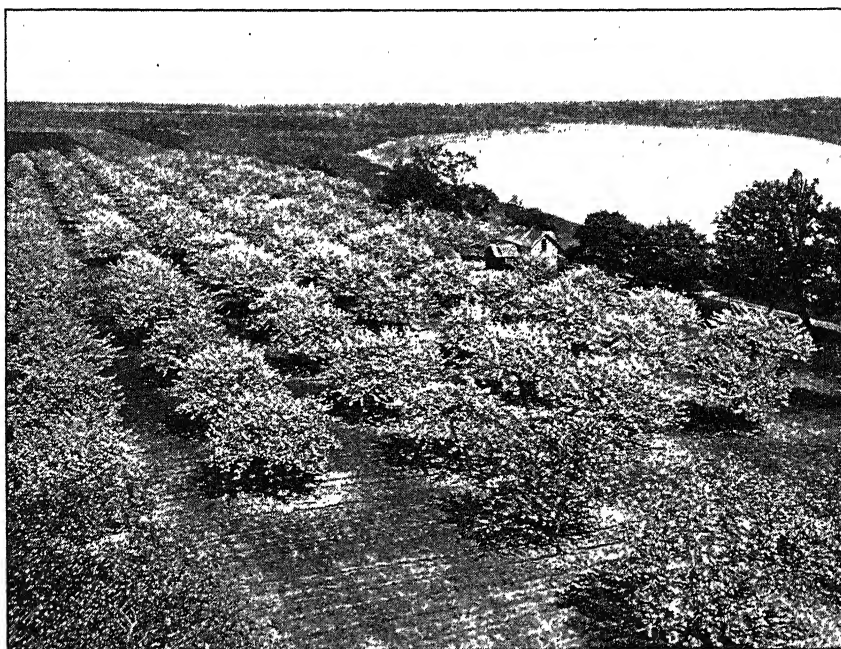


Photo by Owen from Black Star

Apple blossom time in the Annapolis Valley of Nova Scotia. In normal times many of the apples raised here are exported to England.

1. CANADA—A COÖPERATIVE NEIGHBOR TO THE NORTH

Three thousand miles of unguarded frontier. Canada's southern border joins our northern boundary, but from the Atlantic to the Pacific across the entire stretch of three thousand miles, neither soldiers nor sailors guard the frontiers. There are no fortifications. Not any are needed, for Canada and the United States are friends as well as neighbors. The two countries have much in common. Both are populated largely by people whose ancestors came from the British Isles. English is the predominating language although in the

province of Quebec, where many French settled, French is the official tongue as well as English. A thriving, ever-growing trade has developed between the United States and its northern neighbor. Canada sends us more than thirty-five per cent of its exports, and we sell it fifty-eight per cent of its imports. Tariffs are the only barrier to an even greater international trade. Our new reciprocal treaty will no doubt increase trade between the countries when normal times are restored.

The length and breadth of the land. With the exception of Alaska Canada occupies the whole continent of North America north of the United States. Its irregular and broken coastline measures nearly 25,000 miles, the distance around the earth at the equator. No other country in the world has so many lakes and inland waters within its borders. When we think of the extent of our own country, we usually think of it from east to west—Appalachian Highland, Central Plains, Rocky Mountain region, Pacific coast. When we think of Canada we are apt to think of it as stretching north and ever farther north to the Arctic circle and beyond. This is an unfair viewpoint as Canada's east to west expanse is even greater than our own and its physical features, its low eastern highlands, its rolling central plains, its lofty Rocky Mountain regions are but extensions of our own mountains and plains. The resources of the various sections are much the same as ours. The chief difference is one of climate due to the more northerly latitude of Canada. While the range of climate in the United States is from subtropical to cool temperate, in Canada it is from cool temperate to arctic.

The great central plain of Canada includes more than half the area of the Dominion. Its southern portion closely resembles our own North Central States. On the north it merges into a great forest region which in turn merges into the bleak and frozen tundras. The Canadian Rockies form a natural barrier on the west, but railroads, monuments to modern engineering skill, span the valleys and tunnel the mountains, thus opening up the whole of the interior of Canada to the vast possibilities of western communication through the port of Vancouver. In these mountains one finds some of the most inspiring scenery in the whole world. The diversity and charm of the eastern highlands is also well known to the thousands of tourists who visit the region every year, both winter and summer. We share with Canada four of the Great Lakes—Superior, Huron, Erie, and Ontario. The mighty river, St. Lawrence, draining them except for a short distance along the northern border of New York

State lies wholly within Canada. Because of the advantages of the northern latitude, eastern Canada is much nearer Europe than the eastern portion of our own country.

What the weatherman says. The climatic regions of Canada are as varied as its physical regions. In the southern sections of the great plains and the central provinces the summers are short and hot; the winters long and cold. There are summer heat waves similar to those experienced in our country in the North Central States with the thermometer soaring to 90° and above. In winter the temperature as far south as Manitoba frequently drops to 50° below zero. The maritime provinces in the east have a cool, moist summer and cold winters with much snow. The valley of the St. Lawrence has a bracing climate, similar to that of our northern New England. The western slopes of the Coast Ranges of British Columbia, in the same latitude as Labrador, have a very mild, moist climate with luxuriant vegetation due largely to westerly winds from the Pacific. The climate there is similar to that of southern England, only warmer. Because of its climate and the many English people who have settled there, Victoria on Vancouver Island is sometimes said to be more English than England itself. As a whole the climate of Canada is considered to be a very healthful one.

FOOD FOR THE UNITED NATIONS

Canada's contribution. We often hear it said, "Food will win the war." If so, then Canada plays a mighty part in war production. It is one of the leading wheat-producing countries and since the beginning of the war production has been stepped up more than thirty per cent. The population of the country is small; consequently the supply of wheat is greatly in excess of the home demand. There is always a large surplus for export. Now to meet the demands of the war Canada's surplus goes mainly to Britain and Russia. The central plains of Canada are but the extension of our own interior plains. Here is the fruitful wheatland which has for many years invited sturdy, intelligent emigrants from the British Isles and in late years from our own country. Beef and dairy cattle and hogs are also raised in this prosperous region. Although farming is the chief occupation of the Canadian people, only about forty per cent of the possible farm lands have as yet been made available for agriculture.

Butter and cheese. In addition to wheat, dairy products are greatly needed by the armed forces all over the world as well as by

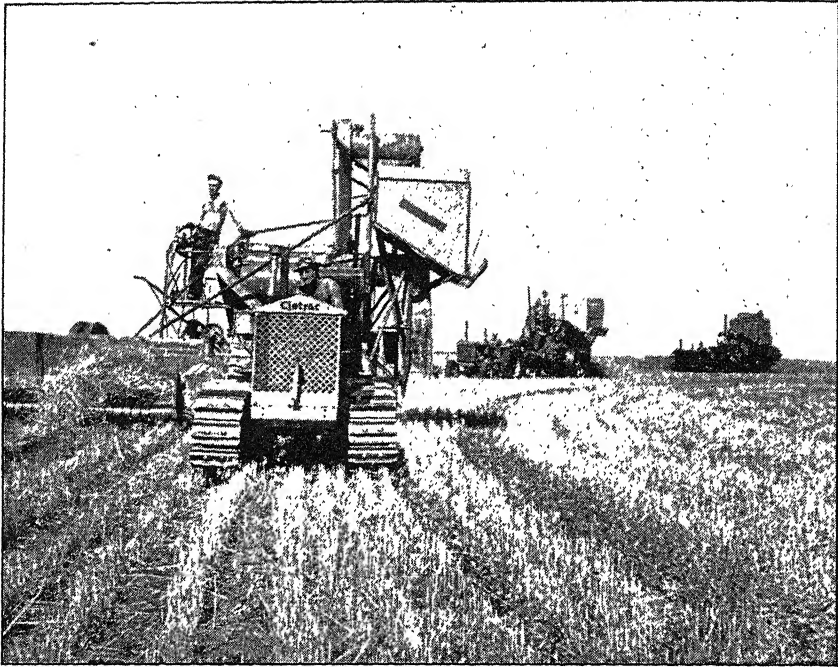


Photo from Black Star

Combines at work on a wheat farm in Saskatchewan. The combine harvests the wheat, threshes it, and sometimes even puts it in sacks. This farm consists of nearly 3000 acres of wheatland.

the civilian population of the United Nations in the Eastern world. In the field of dairy products Canada is one of the world's greatest producers. At times Canada has led all other countries in the production of cheese. Cheese is one of Britain's staple articles of food and that country has always looked to Canada for a large part of its supply. Now greater demands and limited means of transportation have made it necessary to ration in Britain this essential food. Condensed and evaporated milk, important products of Canada's dairies, also help to satisfy an urgent need in the Allied countries overseas. Canada's cool climate, excellent pastures, and abundant hay crop furnish plentiful feed for dairy cattle.

Fruit growing. Fruits, especially those canned and dried, constitute an essential part of the diet of a service man. Here again Canada makes a distinct contribution. Among the fruits of Canada, apples are the leading crop; the value of the yearly commercial yield is about \$10,000,000. The chief producing region is the Annapolis Valley of Nova Scotia. The eastern provinces also produce small fruits, including blueberries and strawberries, quantities of which are



Photo by James Sawders

Grapes growing on the Niagara peninsula between Lake Huron and Lake Erie. This part of Canada extends as far south as the southern boundary of Oregon. Its southern limits are farther south than Boston, Detroit, and Milwaukee.

exported to the United States after the season for those fruits has gone by in our country.

The Niagara Peninsula, the most southern portion of Canada, juts between Lake Huron on the west and Lake Erie and Lake Ontario on the east and is known as the "garden of Canada." Here, as in western New York, apples, peaches, and grapes are raised.

Offshore fisheries. The best fishing grounds in the world are in the cool waters of the northern oceans. Canada, bordering both the Atlantic and Pacific Oceans, has a most advantageous location for carrying on extensive fisheries. Added to the advantage of location is another great advantage, that of a deeply indented coast line with many adjacent islands and many fine harbors. The many inlets and bays give ready access to ocean waters that are teeming with salmon, cod, haddock, halibut, and herring.

These ocean areas are great storm centers and are often blanketed with dense fog. Defying storm and fog and other well-known dangers, Canadian fishermen have built up a fishing industry that is second to none in the world. The value of the salmon fisheries, particularly those of the Pacific Coast, is about equal to that of all the others

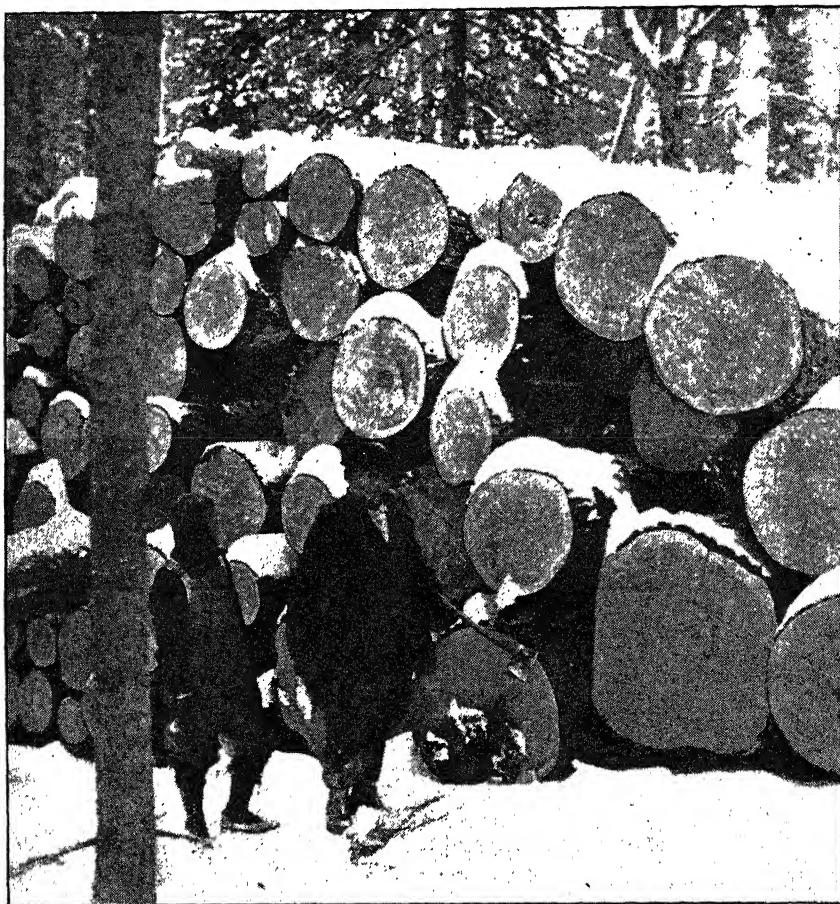


Photo from Triangle Photo Service

Piles of logs in a Canadian lumber camp. They will be floated down the river to the mill when the ice melts next spring. Much of Canada's lumber is exported to Britain.

combined. Along shore Canadian fishermen have also carried on extensive lobster fisheries, but that particular branch of the industry has been pursued so recklessly that lobsters are now becoming scarce and, as in the United States, the catch has to be regulated.

Land-locked waters. In addition to the opportunities for salt-water fishing, Canada also possesses over 200,000 square miles of fresh-water areas. The waters of these numerous lakes and rivers abound with pickerel, trout, and many other varieties of food fish, that lure not only the fisherman who works for a living, but thousands of sportsmen as well. The fisheries of Canada yield a total value of about \$40,000,000 annually. Of this over \$4,000,000 comes from

the fish taken in the many lakes and rivers of the Prairie Provinces. (See illustration on p. 338.)

"Timber!" This shout of warning which the lumberjack gives serving notice that the tree is about to fall echoes through many a Canadian forest. North of the central plains are extensive woodlands extending east and south to the Atlantic and west across the Rockies to the Pacific. The value of the country's forest products is exceeded only by those of the farms and the mines.

The most valuable product of the forests is wood pulp. Much of this is made into newsprint within the country, of which two thirds is exported to the United States. The country has large areas of spruce and poplar as raw material for pulp mills besides abundant water power so necessary in the paper industry. Three fourths of the wood pulp is the output of the two provinces of Ontario and Quebec. With the depletion of our own forests American capitalists turned to those of Canada. Nearly \$500,000,000 of capital from the United States is invested in the paper, pulp, and lumber mills of Canada. This interest is due to the fact that our country is the greatest consumer of newsprint in the world and we are obliged to look to forests other than our own for the supply.

As in the United States, the Pacific Coast is the greatest producer of lumber. British Columbia produces nearly as much lumber as all the other provinces combined. Douglas fir is the most important kind of lumber produced. Quebec comes next in the production of lumber. Fortunately more than one fourth of Canada's forests are at present inaccessible. If they can be saved from destruction by fire and insect pests, this very inaccessibility may be a blessing in disguise—thus saving for future generations a supply of timber. Canada sends large quantities of lumber to Britain and the United States to help meet their war needs.

MINERAL RESOURCES

Pay dirt. About the same time that gold was discovered in California, rich deposits were also found in the Fraser River valley in British Columbia. The swift waters of the river had eroded the soil and gold was found in the sand or gravel along its banks. Armed with shovels and pans the early gold seekers dipped up the sand along the river margins and washed away all but the heavy particles of gold. The gravel was panned and, if it yielded a fair amount of gold, it was called *pay dirt*. These early gold rushers could scarcely



Photo by National Film Board from Black Star

Coal mining on Cape Breton Island, Canada. Drilling holes for blasting. After coal is removed, wooden posts are set up to prevent the roof from falling.

do more than scratch the surface. The real value of the wealth of the mines was undreamed of until they were worked methodically and scientifically in later years. With steam to thaw the ground and huge streams of water to dislodge the gravels, mining can be profitable even though there be but an ounce or two of gold to a ton of ore.

For more than twenty years Ontario has led all other provinces in gold production. The gold there is in the solid rock which must be mined, brought to the surface, and pulverized before the precious metal can be extracted and refined. Canada ranks third among the gold-producing countries of the world. Using airplanes now instead of plodding on foot or by sledge as the early gold seekers did, prospectors are constantly pushing farther and farther north into Canada's untried wilderness—one of the greatest unprospected mineral areas in the world.

Canada's coal bins. The wealth of the coal mines is second only to that of the gold fields. The mines are fairly evenly distributed in the different sections of the country. Nova Scotia mines an excellent grade of soft coal that finds a ready market in eastern Quebec. British Columbia exports some coal to our western states which are

lacking in coal. The coal deposits in central Canada are of comparatively poor grade and in the markets of Ontario and Quebec the coal meets with a great deal of competition from the product of our Ohio and Pennsylvania mines.

Oil in northern Canada. Deposits of oil have been discovered along the Mackenzie River at Fort Norman and along the Athabasca River. For centuries Indians in the Athabasca Region have used the pitch formed from oil seepages to caulk their canoes. It is estimated that the field contains reserves of one hundred billion gallons of oil. It is difficult, however, to extract it from the sands which are saturated with it. The oil does not flow into a well fast enough to permit pumping. After years of experimenting methods of extracting and refining the oil have been perfected. It will be possible to pipe oil from these fields to the Alaska Military Highway where filling stations are needed to service the cars and trucks of that road.

Other sources of mineral wealth. Nickel is playing an increasingly important part in present-day manufactures. Munitions, airplanes, tanks, and trucks use it extensively. The United States obtains nearly all its supply of nickel from Canada. Nearly ninety per cent of the world's supply of nickel and twenty-five per cent of its cobalt are mined in southern Ontario. Cobalt is a component of valuable alloys used in the manufacture of cutting tools. It is also used as a pigment in the coloring of glass—one tenth of one per cent will give a deep-blue color to glass. Asbestos is a fibrous, flexible mineral found in Quebec. When shredded, it looks like wool and it is often spoken of as *mineral wool*. It neither burns nor melts at ordinary temperatures, and being a poor conductor of heat it is used extensively to cover boilers, furnaces, and steam pipes and as an insulation for houses to prevent the escape of heat. It is also used in the manufacture of fireproof safes and to fireproof partitions of buildings. Cloth woven from its fibers is fashioned into fire screens for our theaters and into fireproof suits so necessary to men fighting the flames of burning gas and oil wells and forest fires.

FURS

Mighty hunters. Following closely on the heels of Champlain, Cartier, and other early French explorers, there came a troop of hunters and trappers in quest of the valuable furs to be had for the taking or to be bought from the Indians in exchange for a handful of beads. On snowshoes these hardy men pushed their way into the



Photo by James Sawders

A silver-fox farm in New Brunswick. The men who first began to raise foxes made the most money by selling the animals to others for breeding purposes.

great white wilderness of northern Canada. Countless numbers of ermine skins were needed for the royal robes of European kings and queens. Rich furs were a part of the dress of all the nobility of that day; so there was also a great demand for the pelts of the sable, mink, marten, beaver, fox, and seal.

To carry on this lucrative trade in furs, the great Hudson's Bay Company, which is still in existence, was founded in 1690. Trading posts were established on the shores of Hudson Bay itself as well as farther south. Skins, particularly those of the beaver, were used in place of money. Even today a Hudson Bay blanket has several short stripes woven near one corner to indicate to the Indians its exchange value—three if worth three pelts; four, if worth four pelts. Fur-trading posts became the outposts of civilization and later many thriving cities grew up on their sites. Winnipeg is now the chief collecting and distributing center for the fur trade of Canada. Montreal ranks second. Canada is the leading country in the production of furs.

Fur farming. So ruthless and shortsighted were many of the methods used in carrying on this very profitable trade that many

animals were in danger of becoming extinct. To overcome this threat and at the same time meet the heavy modern demand for furs, fur farming is now carried on extensively in parts of Canada. Animals can be bred for certain specific qualities and their pelts matched even more exactly than when captured in the wild. Silver-fox farms were the pioneers in this novel industry. Mink, raccoon, marten, skunk, muskrat are also successfully bred in captivity. It has been said that a millionaire can wear only one pair of shoes at a time, but that a million people need a million pairs of shoes. The same truth applies to the wearing of furs. Whereas in the old days only the royalty could afford to wear them, now, with increased prosperity, their use has become widespread and there is a constant demand which provides a steady market for all that the trapper can procure and the fur farmer can raise. More than half of the furs worn in this country come from Canada.

CANADIAN INDUSTRIES

"The twentieth century belongs to Canada." Sir Wilfred Laurier, one of Canada's greatest premiers, made this prophecy more than thirty years ago and the facts and figures of today prove the soundness of his judgment. Nowhere do we see more progress than in Canada's manufactures which now are double the value of its agricultural products.

The leading manufactures of Canada in normal times are those which take for their raw materials the products of the farms and ranches. Flour milling and meat packing are important industries. Butter and cheese help to swell the total. Canada is one of the leading countries in the value of cheese exported. In our study of the forests we noted the great value of the paper and pulp produced. The manufacture of textiles and of products of iron and steel is also important. Three fourths of the manufacturing is carried on in the provinces of Ontario and Quebec. These provinces have the advantages of abundant power and accessibility to the industrial regions of the United States and Europe. The rapid development of water power for the generation of electricity has greatly stimulated manufacturing of all kinds.

In the Laurentian Highlands of Canada there has been completed recently one of the world's largest hydroelectric projects. The output of power is greater than that of the great Dnepropetrovsk Dam which the Russians destroyed in advance of German occupation.

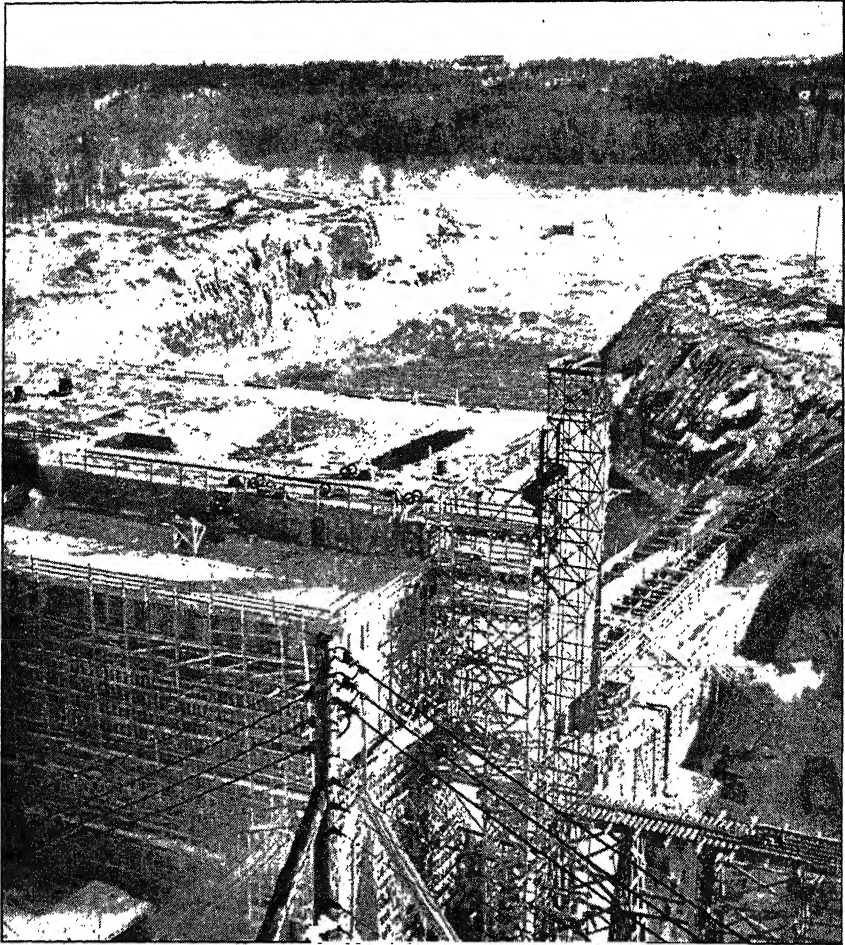


Photo by the National Film Board from Black Star

Rushing to complete one of the world's largest hydroelectric plants. This is the Shipshaw Plant on the Saguenay River in northern Quebec. This plant is larger than Boulder Dam on the Colorado River and will have an output fifty per cent greater than the American plant. Its purpose is to meet the wartime need of aluminum.

The Canadian plant is now generating more power than either the Bonneville Dam or the Grand Coulee Dam of our own Northwest. The project was financed by Canadian and American capital with the purpose of increasing Canada's output of aluminum. Around this great generator of electricity is growing up gradually the greatest aluminum plant in the world.

As in the case of the lumber and paper industries, much foreign capital is invested in other Canadian mills and factories. Capital from the United States totals over \$4,000,000,000 while that from

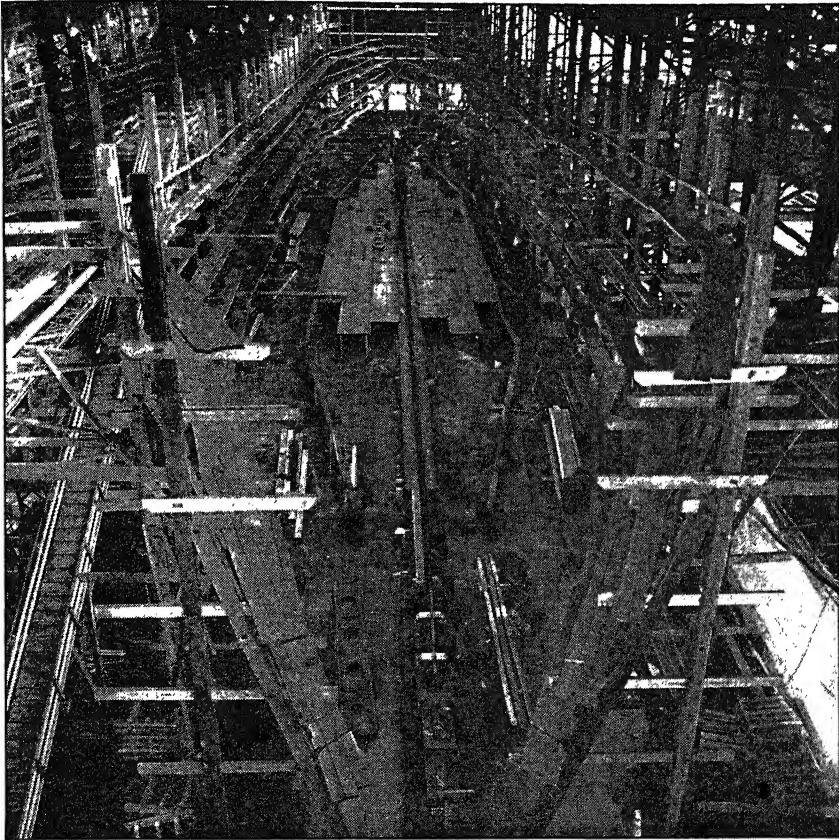


Photo by James Sawyers

Laying the keel for a new ship at a Canadian shipbuilding plant. Note the platforms to be used by the workmen as the hull of the ship is being constructed.

Great Britain before the war was about two thirds as much.

Canada's industries "all out" for war. Branches of American automobile factories were among the first to turn to defense production. Before the war Canada had no airplane factories. Now there is a chain of factories extending across the country employing many thousands of men and women. It was found best to have most of the engines made in the United States. Although Canada has never had large iron and steel plants, it is turning out tanks at the rate of more than three hundred per month. The country also produces explosives of various kinds. Many types of shells are made and a variety of guns, including machine guns, the most of which are sent overseas. Canadian munition factories specialize in the production of armor-piercing shells. Unlike the United States which could convert existing plants to defense industries, Canada in most cases was

obliged to construct new buildings and to install new machines before it could begin production.

Canada's shipbuilding program has been greatly stimulated by the war. A 10,000-ton merchant ship is launched every two or three days. Another product of the shipyards is the corvette, a new type of subchaser equipped with small guns and depth charges. Canada's navy consists of several hundred ships mostly of the smaller types. They have rendered valiant service in convoying thousands of ships across the Atlantic.

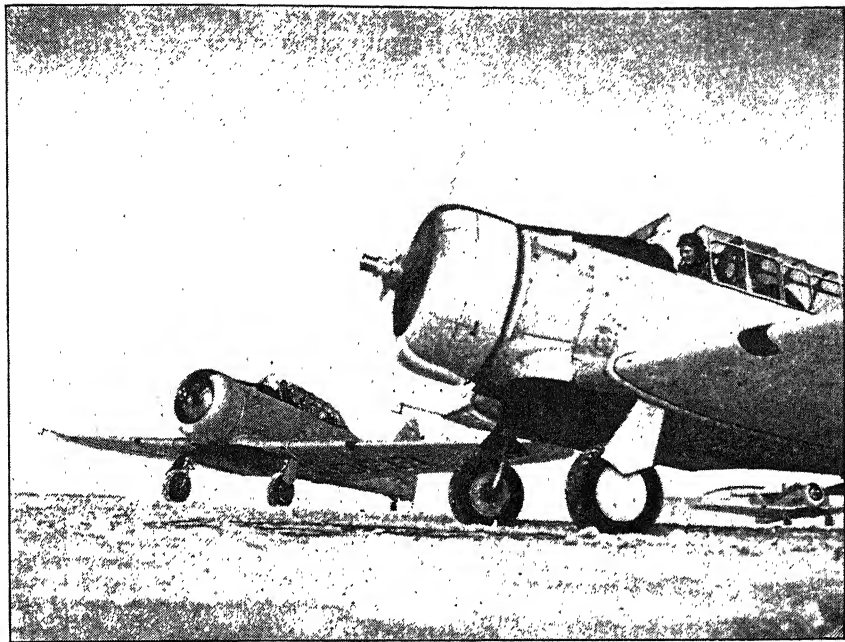
TRANSPORTATION

Canadian railroads. Southern Canada is well supplied with railways. The great wheat and grazing lands would be practically useless without them. Three continental lines connect the eastern ports with those of the west. The eastern terminals in summer are Montreal and Quebec. In winter when the St. Lawrence is closed by ice, Halifax and Saint John become the terminals. During the winter season much of the Canadian foreign trade moves southeasterly across the United States through our North Atlantic ports. One of the transcontinental lines, the Canadian Pacific, owned a fleet of large ocean steamers which sailed from both Atlantic and Pacific ports. When war broke out, these ships were taken over by the British Government to transport food and military supplies. The Canadian Pacific also maintains sumptuous hotels in all important cities and at famous summer resorts along its route.

Canada in the air age. The country is very favorably located for air transportation. It borders the Arctic Ocean and therefore offers a short over-the-pole route to northern Europe and northern Asia. To the east by way of Newfoundland lies the shortest air channel to Britain.

Air transportation has brought Canada much closer to Britain. Bombing planes are "ferried" across the Atlantic in from seven to nine hours. In this way the American-made bomber reaches the fighting front in the shortest possible time; ship space is saved, and there is no danger from submarines. At the same time the bomber carries important passengers and some freight.

On the northwest of Canada lies Alaska a strategic air-line center across which runs a route to the Orient. Canada and the United States have marked out air zones from Edmonton to Alaska. Squadrons of planes could move from the United States across Canada to

*Photo from Black Star*

Training planes on a Canadian airfield. No plane starts off until the "all-clear" signal is given. Here two Harvard trainers await the signal while a third is coming up for its turn.

Alaskan outposts for quick action against Japan or for the purpose of giving aid to China or Russia.

Within the country the airplane has greatly reduced the hazards and hardships of the miner and the hunter. Both are carried over trackless wastes in hours instead of weeks or months. There is regular transcontinental air service between Montreal and Vancouver. As in the United States air-line companies are doing their best to make the people air-minded and to persuade them to make use of swifter means of travel.

Schools for airmen. The great stretches of Canada's level plains offer marvelous advantages for the scores of schools in which air pilots are trained. Canada trains more than 40,000 pilots per year. The country has been referred to as a pilot factory, and it is considered to be the best factory in the world. For this reason it is recognized as the "Airdrome of Democracy."

Besides training its own men Canada trains thousands of young men from Britain, Australia, New Zealand, and the occupied countries. Before the United States entered the war men from our country enlisted in the Canadian Air Force or the Royal Air Force

and received their training in Canada. The expense of training a pilot is \$21,000 and the cost of training other members of the crew and ground force is proportionately large.

The results of this training are shown on all battle fronts. Canadians take part in raids over Germany and the occupied countries. More than a thousand Canadians took part in the great raid on Cologne. The country has more than a half million men in service overseas. Sixty per cent of the men and women in the country are either in the armed forces or are employed in war industries.

Canadian cities in normal times. *Montreal* is Canada's largest city and leading port. It is at the head of navigation on the St. Lawrence for large ocean-going ships. Since a large part of Canada's trade is with Great Britain and the United States, Montreal is favorably placed for transatlantic trade and for shipments to and from industrial United States. Montreal might be thought of as the New York of Canada. *Winnipeg*, the Chicago of Canada, is in the heart of the great grain and cattle regions. It is centrally located for grain moving eastward to the Great Lakes and for that which is transported west to Vancouver and then to Europe by way of the Panama Canal. *Vancouver* is the leading port on the Pacific Coast carrying on transpacific trade and trade with Europe through the Panama Canal. *Toronto*, Canada's largest port on the Great Lakes, is in the center of a rich agricultural and mining region. It has access to the power of Niagara Falls. Its varied manufactures include large meat-packing plants and it is a distributing center for this part of the Dominion. *Ottawa*, the capital of the Dominion, has access to the abundant water power of the Ottawa River. It has 200 manufacturing plants. Quaint *Quebec* is a seaport of some importance.

NEWFOUNDLAND

Great Britain's oldest colony. Off the eastern coast of Canada, nearly spanning the entrance to the Gulf of St. Lawrence, lies the island of Newfoundland which politically has never been a part of Canada. This colony includes that part of the mainland known as Labrador. The surface of the island is too rugged and too heavily wooded and the climate too cold to carry on much agriculture. Off to the south, however, lie the Grand Banks, the most prolific fishing banks in the world. Until recently fishing was Newfoundland's most important industry. Fishing now ranks second to the manufacture of newsprint. Newsprint and fish are the country's leading

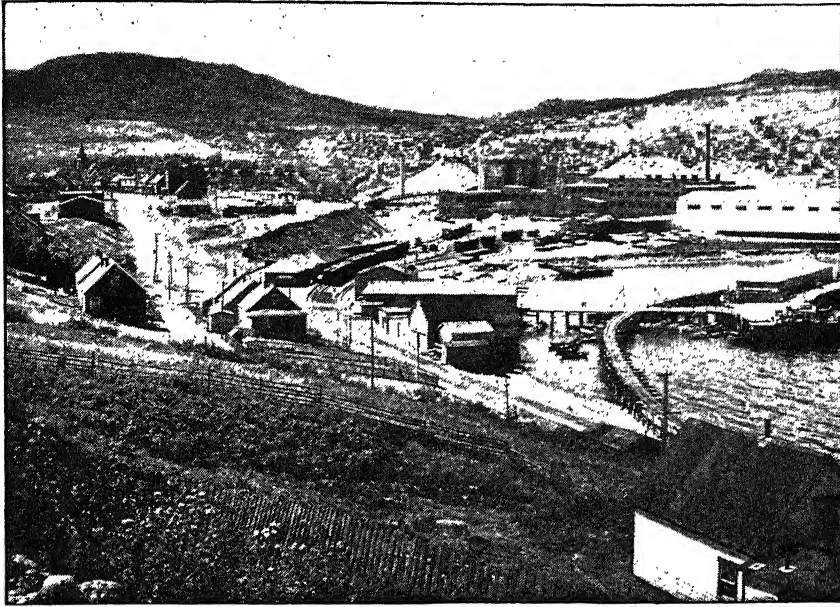


Photo by Marvin Breckinridge from Black Star

A large pulp mill in Newfoundland. The island has extensive forests of pine and spruce which furnish the raw material for pulp and paper mills. The chief income of the people is derived from this source. Formerly the codfisheries, the value of which per year is often more than \$20,000,000, furnished the people with their principal income.

exports. Because of its scenic attractions and the abundance of game and fish Newfoundland is a sportsman's paradise. It is from Newfoundland that planes leave North America for Europe. The future offers very bright prospects to the island as a center of air travel. The people of Labrador are engaged chiefly in fishing. The missionary work that Sir Wilfred Grenfell did along this coast aroused great interest among English-speaking people in the work and life of the inhabitants.

GUIDES TO STUDY

1. The area of Canada is greater than that of the United States. Why is its population so much smaller than ours?
2. From the Atlantic to the Pacific how do the physical features of Canada compare with those of the United States?
3. What advantages of location does Canada possess with respect to world-wide airplane trade routes?
4. How does the climate of southeastern Canada differ from that of southwestern Canada? From that of south-central Canada?
5. How do the agricultural products of these three regions differ? Why do they differ?

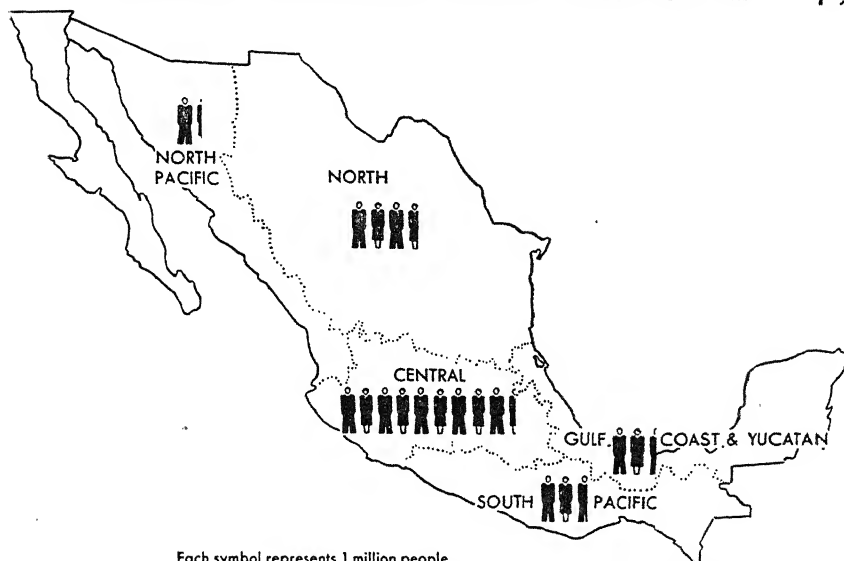
6. If food is man power, how is Canada helping to win the war?
7. Why are the people of the United States deeply interested in the forests of Canada?
8. How do the mining methods of today differ from those of former years? Why?
9. Of what minerals does Canada have almost a monopoly of the world supply?
10. Of what importance is the recent discovery of oil in the Canadian Northwest?
11. What are the advantages of fur farming over hunting for fur-bearing animals?
12. What part has fishing played in the history of Canada and in the development of its trade?
13. What are the country's leading manufactures, and what advantages are offered for each?
14. How are Canada's industries linked with the industries of the United States?
15. Why has Canada's trade been largely with the United States and Great Britain?
16. What is Canada doing to increase the air power of the Allies?
17. Why has Newfoundland's fisheries been reduced to second place in that country's leading occupations?

TOPICS FOR CLASS DISCUSSION

1. Canada's relations with the United States.
2. Canada's relations with Great Britain.
3. Canada's thinly settled areas.
4. Canada's advantages for aviation.
5. Canada, the airdrome of democracy.

WORK TO BE DONE

1. Using the scale of miles on the map showing Canada (Pl. 2), find the distance from the Atlantic Coast to the Pacific. From the southern border to the Arctic Ocean. Estimate the number of square miles of area. Compare your estimate with the table in the Appendix.
2. What attractions does Canada offer tourists? Look in newspapers and magazines for advertisements of special areas.
3. On an outline map indicate the locations of the chief cities of Canada. Learn as fully as you can what resources, industries, and trade are responsible for the importance of each.
4. On the same outline map trace Canada's chief air lines. Why do they run in these directions?
5. Using encyclopedias and other references make a careful study of the Hudson's Bay Company and learn what it has done for the development of Canada.



Pictograph Corporation for the Coördinator of Inter-American Affairs

2. MEXICO—A COÖPERATIVE NEIGHBOR TO THE SOUTH

The country and its climate. Bordered on the north by California, Arizona, New Mexico, and Texas, this Latin-American country has a common boundary with the United States about 1600 miles long. Its area is a little more than one fourth that of the land area of the United States. In fact, its area very closely approximates that of the four states on its northern border with Oregon thrown in. It has a population of nearly twenty million or almost one third more than the five states mentioned above.

While the tropic of Cancer cuts Mexico in two, the great elevation of its land surface produces three distinct kinds of climate: the hot land, called *tierra caliente*, from sea level to about 3300 feet; the temperate land, called *tierra templada*, from 3300 feet to 6000 feet; and the cold land, called *tierra fria*, above 6000 feet. The temperature range varies as much as 90°.

The northern half of Mexico is largely desert land. The seven northern states and two territories of Lower California occupy more than half of the area of the country. Only about one fourth of the inhabitants have their homes in this area. Two mountain ranges cross the country from north to south running roughly parallel to the two coasts. Between the two ranges extends a vast tableland, which is 5000 to 8000 feet above sea level. The central and southern parts of this area constitute the heart of Mexico. This tableland, or

plateau, enjoys a delightful and healthful climate. The land, especially in the valleys, is fertile with enough rain for farming. The products are those of a temperate land but vary with the altitude. The Mexican plateau occupies about one sixth of the total area of the country. Yet on this plateau and on the lower slopes of the mountains that hem it in live two thirds of the inhabitants.

The hot lands of Mexico. The coast lands on both east and west, as you would expect, are lowlands varying in width with the approach of the mountain ranges to the sea. In places they are only a few miles wide. The eastern coastal plains are for the most part fertile and have an abundance of rain. The climate is hot and humid. Tropical vegetation grows dense. In the swamps mosquitoes and other disease-carrying insects breed which infect the inhabitants with malaria, yellow fever, and other tropical diseases. The western coastal plains have little rain and crops are raised by irrigation. These lowland areas are very sparsely settled, for including the seaports the average density of population in the lowlands is only two or three inhabitants to the square mile.

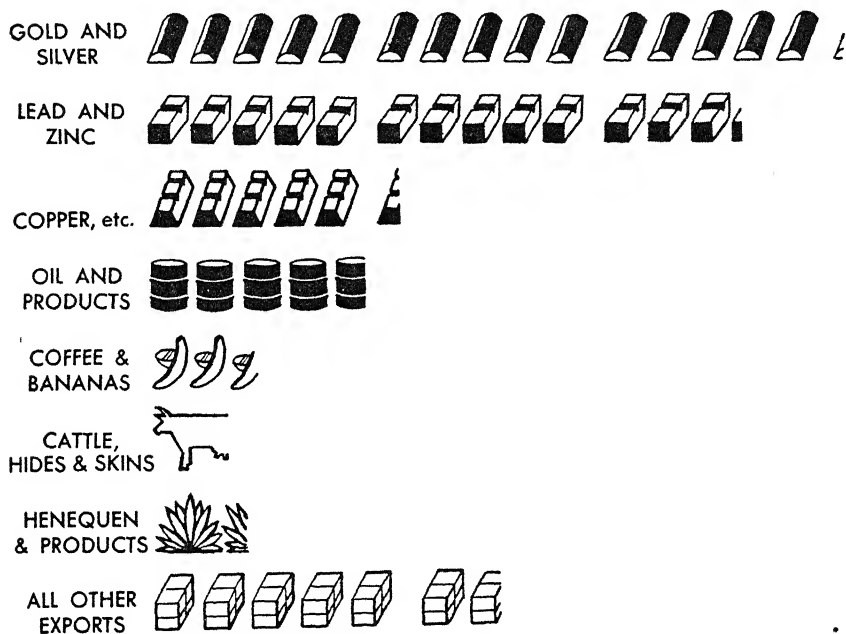
The cold lands. Those parts of Mexico that have an altitude of 6000 feet or more are called the cold lands, *tierras frias*, but the weather is never very cold. Frost seldom occurs except on the higher mountains. There is, however, considerable difference in temperature between sunlight hours and night. The natives nearly always wear or carry their blankets, or *serapes*, and tourists find woolen clothes comfortable.

The temperate lands. The most densely inhabited part of Mexico is that between 3300 and 6000 feet above sea level. This is the temperate land and much of the tableland, or plateau, is included in it. There is not much difference in temperature the year round. Mexico City in the Federal District has an annual range of temperature between 65° and 75° F. This mild climate is conducive to the production of a larger variety of crops than are actually grown.

The principal crops raised for home consumption are corn, wheat, barley, and beans. These grains and beans prepared in different ways constitute the chief foods of the great majority of the Mexicans and Indians. Their food, therefore, is notably lacking in the fats that are essential in a well-rounded diet.

Why we are interested in Mexico. We need the products of Mexico, and the Mexican people need manufactures from our factories. Because of the war we are purchasing larger quantities of Mexican raw materials than ever before. When Japan made the

EVEN BEFORE THE WAR, MEXICO EXPORTED MOSTLY MINERALS



Each symbol represents 2% of value of Mexican exports

Pictograph Corporation for the Coordinator of Inter-American Affairs

sneak attack on Pearl Harbor, the Mexican government took its stand beside our government, promised us its help, and a little later declared war on the three Axis partners. We appreciate the coöperation the Mexicans are giving toward winning the war. They are patrolling their coast lines, which helps to protect the Panama Canal; they are stepping up production of needed war materials; and they are sending harvesters into our country to assist in saving crops that might be lost because of our shortage of farm labor. They are proving to be good neighbors.

The wealth of centuries. Since 1521 when the Spanish conquered the country, Mexico has given to the world over two thirds of all the silver mined, and today this country leads all others in the production of this precious metal.

Silver is found in every one of Mexico's twenty-eight states. Many of the mines yield silver alone and others silver mixed with various ores, notably lead.

Gold is found in eighteen states, but gold mining has declined.

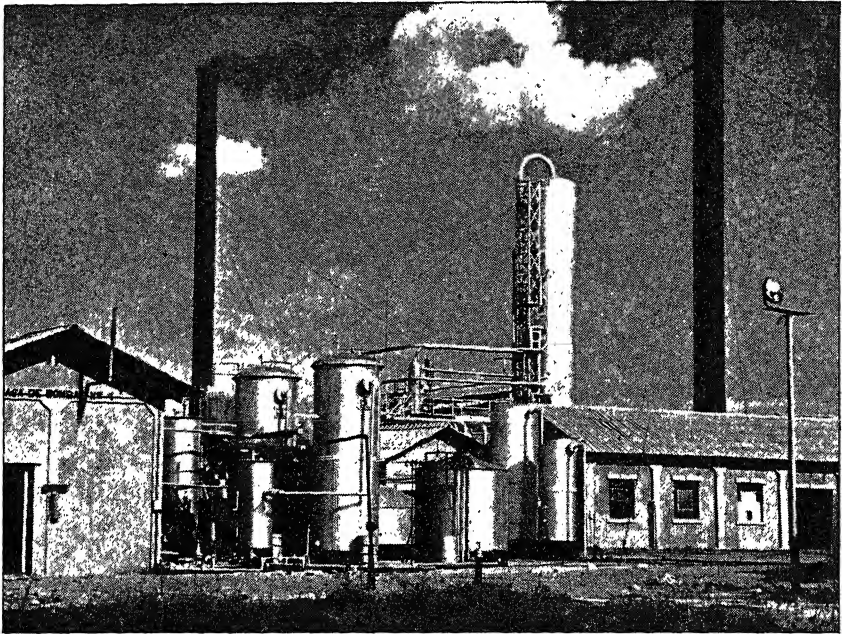


Photo by Amero from Triangle Photo Service

A Mexican oil refinery formerly owned by a foreign corporation but expropriated by the Mexican Government for the benefit of the workers and the country as a whole

Besides silver, lead, and gold, Mexican mines produce copper, iron, coal, and zinc. Near Durango there is a mountain of iron estimated to contain millions of tons of ore. These deposits await a greater demand and better means of transportation.

Oil and water that mixed. For a number of years Mexico ranked second among the nations of the world in the production of petroleum. Mexican oil did much to help the Allies win the first World War. About 1920 the supply of oil began to fail and some of the oil wells began to fill with salt water. Now Mexico has fallen to seventh place in world production. Interest in Mexican oil began at the start of the present century. Oil magnates from the United States were invited to come to Mexico to study its oil resources and to develop them. Instead of traveling all over the country seeking oil, the investigators made a study of maps. Wherever they found a name signifying oil, tar, or pitch, there they sought oil. In those places there had been seepages of oil from the ground for many years and places had been named because of the presence of these products of petroleum. The plan proved a great success, and the oil discovered gave Mexico a high place in oil production for many



Photo from Triangle Photo Service

The distribution of small farms to landless Mexicans and Indians is bound to have a wholesome effect. It will make better citizens of the recipients and raise the standard of living of this generally poverty-stricken element of the population. This peasant farmer is now cultivating his own cornfield.

years. In the past this industry was controlled almost entirely by British and American investors. Much of the petroleum was exported to the United States and Great Britain. In 1938 the oil properties were *expropriated* by the Mexican Government, that is, they were forcibly taken from the control of foreign capitalists and taken over by the government. Arrangements have already been made whereby the former owners will receive payment for the property thus taken from them.

Farming and land ownership. Agriculture and stock raising are the chief industries of the country despite the backward methods that are used. Farming is still largely carried on as it has been for generations with the crudest of implements. Often planting of corn or beans is done by making a hole in the ground with a sharpened peg, dropping in the seeds, and covering them with earth with the foot. On the *haciendas*, or vast estates, owned by the rich land-owners more modern practices and modern machinery are in use. Ownership of large land holdings goes back to the Spanish colonial system. These estates often have thousands and even hundreds of thousands of acres in them. The owner probably has his residence

in Mexico City or some other city and spends only a small portion of his time on the estate. He employs an overseer and a host of laborers, called *peons*, to produce the crops and look after the cattle. In earlier times these peons were virtually slaves, being born, living, and dying on a single estate.

Since the peasant revolution, which began in Mexico in 1910, there has been a strong political movement to improve the condition of this class by dividing up the haciendas and assigning the small farms to the poor. The government seizes the estate to be divided, then allows the peasants, who certify they have no land or means of support, to use this government land, paying rent out of their crops. Between 1915 and 1941, 65,000,000 acres were assigned to 1,606,507 needy peasants. The small holdings thus distributed can afford subsistence for the former landless peasant and his family.

The chief temperate zone farm products—corn, wheat, barley, and beans—have already been mentioned. They are grown principally on the central plateau and furnish the chief food of the poorer classes, including the Indians. In the central part of the northern plateau along the Nazas River large plantations are producing excellent cotton by irrigation. Other large plantations growing cotton are in Lower California.

Sugar cane grown on the eastern lowlands furnishes enough sugar for the Mexican people. Bananas and other tropical fruits are produced not only for home consumption but for export. The Mexicans also raise their own coffee, cacao, chile peppers, and tobacco and have an exportable surplus.

On the plains of the Pacific Coast rainfall is light and irrigation is necessary. There are raised tomatoes, peppers, and green peas which are marketed in the United States during the northern winter. This hot lowland also produces the vanilla bean from which vanilla extract is made. From this region comes more than one fourth of the vanilla beans used in the United States.

The green gold of Yucatan. Sisal obtained from the henequen plant competes with Manila fiber in making rope and binder twine used in tying bundles of wheat. Sisal fiber is not so strong as Manila hemp, but it is useful for many purposes where great strength and durability are not required. Since sisal is injured by salt water, rope made of it is not so desirable for use on ocean-going vessels. Large quantities of the fiber are exported from the port of Progreso. The growing of henequen and the preparation of the fiber has brought prosperity to Yucatan.



Photo by James Saunders

Drying sisal in Yucatan, Mexico. Sisal is also produced in East Africa and in the Netherlands Indies.

Formerly the United States received nearly all of its import of sisal from Mexico. In recent years the British in East Africa and the Netherlanders in Netherlands Indies have established plantations for raising henequen. Now the latter plantations are in the possession of the Japanese and shipping difficulties make us again largely dependent on the Mexican product.

The raising of henequen is about the only industry of Yucatan. The plant has long, tapering, fleshy leaves with strong fibers running from end to end. Formerly the fibers were separated from the pulp by hand, but this was a slow and tiresome process. Now the work is done quickly and efficiently by machine. The growth of the industry has been due largely to cheap and rapid machine methods of production. After separation the fibers are dried and baled for transportation.

Where we get our chewing gum. The substance of most of our chewing gum is *chicle*, the hardened juice (latex) of sapodilla trees growing chiefly in Mexico and British Honduras. The latex is obtained from the trees in much the same way that rubber trees are tapped. The latex is hardened by boiling and drying. It is then pressed into blocks for shipment. When it reaches the factory in



Photo by James Sawders

Where we get our chewing gum. The latex is obtained from the trees in much the same way as natural rubber. Gashes are cut in the tree in the early morning and the workmen return to empty the cups later in the day.

the United States, it is mixed with small quantities of other substances, flavored, and put up in the form that we know so well. Crude chicle is exported to the United States and Canada. The value of that imported annually by the United States alone is more than one and one half million dollars. In the past the value of the chewing gum exported from our country has been equal to two-thirds that of the chicle imported.

Undeveloped resources. Only one fourth of the arable lands are cultivated, and on these primitive methods are used. The mines would yield larger returns if there were assurance that the investments would be safe. The country has extensive forests rich in pine, spruce on the higher lands, and mahogany and rosewood on the low, hot plains. Eventually the world will make use of these partially developed forests.

There is opportunity for development of the tourist trade, which is constantly increasing. Tourists are attracted by the beautiful scenery of parts of the country, by the many places of historic interest, and by the customs and handicrafts of the people. Much of their handiwork, consisting of pottery, glassware, and embroidery, is

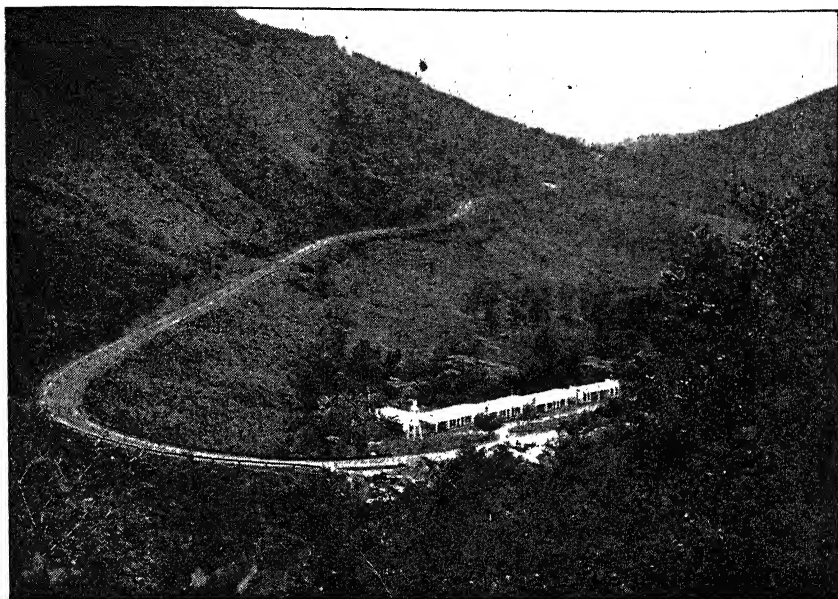


Photo by Hugo Brhme from Triangle Photo Service

A section of the Pan-American Highway running from Laredo, Texas, to Mexico City. This is a part of the highway that will eventually be completed from Alaska to Chile.

brought back by the tourist and is also offered for sale in all parts of the United States.

Tourists reach Mexico by railroad, by bus, and formerly by steamship. Four American railroads—Missouri Pacific, Texas and Pacific, Atchison, Topeka and Santa Fe, and Southern Pacific—connect with Mexican railways at the border. The country has several good airports and is served by Pan-American Airways and American Airlines. An air line connects Yucatan with Cuba.

There is little manufacturing. The chief manufactured articles are foods and beverages. There are several hundred small plants manufacturing textiles and shoes; yet nearly all the country's manufactured goods are imported.

A country depends upon its people. Humboldt, a noted geographer, once compared Mexico to a beggar sitting on a bag of gold. The gold, of course, is the country's resources. The beggar represents the poor backward people of the country. The development of resources and an increase in prosperity have followed from the demand for war materials. A new day has dawned for Mexico.

The early conquerors, the Spanish, were not interested in Mexico except for the wealth which they could take from the country and

ship to Spain. Agricultural lands were divided among the Spanish while the poor natives were little better than slaves.

As in our own country, the original inhabitants were Indians. More than half the present population are of mixed race, resulting from the intermarriage of the Spanish and the Indians. Thirty per cent are Indians and only fifteen per cent are pure whites. The latter are well educated; they control the wealth and constitute the influential portion of the population. The Indians and many of the mestizos form the laboring classes, or *peons*. Education and ownership of property will no doubt lead to greater interest in public affairs and in the welfare and progress of the country.

Mexico's foreign commerce. The chief exports of the country have been metals, including silver, gold, lead, zinc, and copper. Then in order of importance came petroleum and its products, gasoline, and lubricating oils. Mexico has two of the largest refining plants in the world. Other exports of importance have been cotton and coffee.

Among the leading products that have to be bought abroad are foods, machinery, equipment for mines and oil wells, automobiles, and chemicals.

GUIDES TO STUDY

1. Why are the people of the United States interested in Mexico?
2. Account as fully as you can for the climate of each of Mexico's geographical regions.
3. How does the mineral output of Mexico today differ from that of past centuries?
4. How can old maps aid in locating oil deposits?
5. Why do Mexicans prefer to manage their own oil wells?
6. What physical divisions of Mexico are similar to those of the United States?
7. In what respects do the products of corresponding divisions of the two countries agree? In what ways are they unlike?
8. Why are there relatively few people living along the eastern and western coasts of the country?
9. What products of Mexico come to the United States? Why?
10. How do climatic conditions in East Africa and Netherlands Indies compare with those of Yucatan?
11. What is *chicle* and how is it prepared for market?
12. What can Mexico do to increase its tourist trade?
13. What is necessary for the greater development of Mexico's resources?
14. What does the list of Mexico's exports tell of the country's resources and industries?
15. How do the decorations on Mexican manufactures reveal the life of the people?

TOPICS FOR CLASS DISCUSSION

1. Mexicans in the United States.
2. American visitors to Mexico.
3. Mexican volcanic mountains.
4. Land ownership in Mexico.
5. Transportation in Mexico.
6. Mexico, a beggar and a bag of gold.

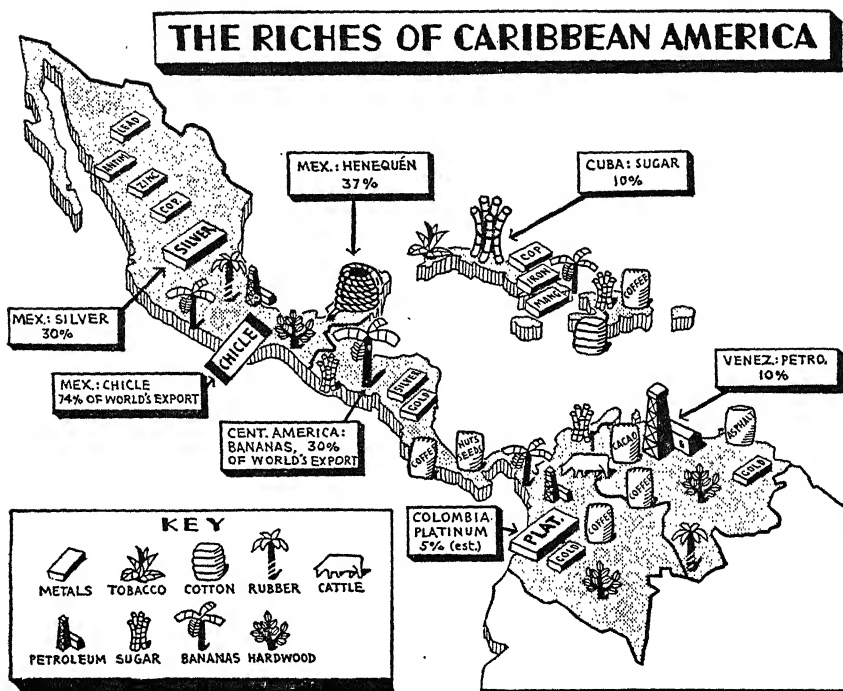
WORK TO BE DONE

1. On a desk outline map of Mexico (which the pupil may make himself) locate the chief mountain ranges, the principal cities, and the leading producing areas—agricultural and mineral. Trace on this map the part of the All-American Highway which runs through Mexico. (See map p. 441.)
2. Topics for special reports: (1) The conquest of Mexico by the Spanish; (2) The acquisition of Mexican territory by the United States; (3) The oil wells of Mexico.
3. Make a list of Mexican products found in your homes or for sale in local stores.
4. Prepare an exhibit made up of Mexican products and pictures of Mexican products.

3. CARIBBEAN LANDS—REGION OF MANY STRATEGIC OUTPOSTS

Treasures old and new. The northern coast of South America and the bordering waters are the *Spanish Main* of the early explorer and pirate. It was here that Columbus first saw the land of the New World and believed that he had reached India. Here came Spanish explorers and pirates of many nations in search of gold and silver. As a safeguard treasure was often buried on shore. Many a search has been made in the hope of finding some of this hidden wealth. Stevenson's *Treasure Island* is a fascinating story of such a quest.

All the Caribbean lands were conquered and for a long time controlled by foreign nations. Nearly all have since gained their freedom. Only the Guianas, British Honduras, and some of the smaller islands still remain colonies of European powers. Ships sailing the Spanish Main in our day have carried little gold and silver. The treasure consisted rather of fruits, sugar, coffee, and petroleum. Our interests in the region are very great because of the investments of American capital and because of nearness to the Panama Canal and to the United States itself. Nearly all the Caribbean lands have carried on a greater commerce with the United States than with any other country.



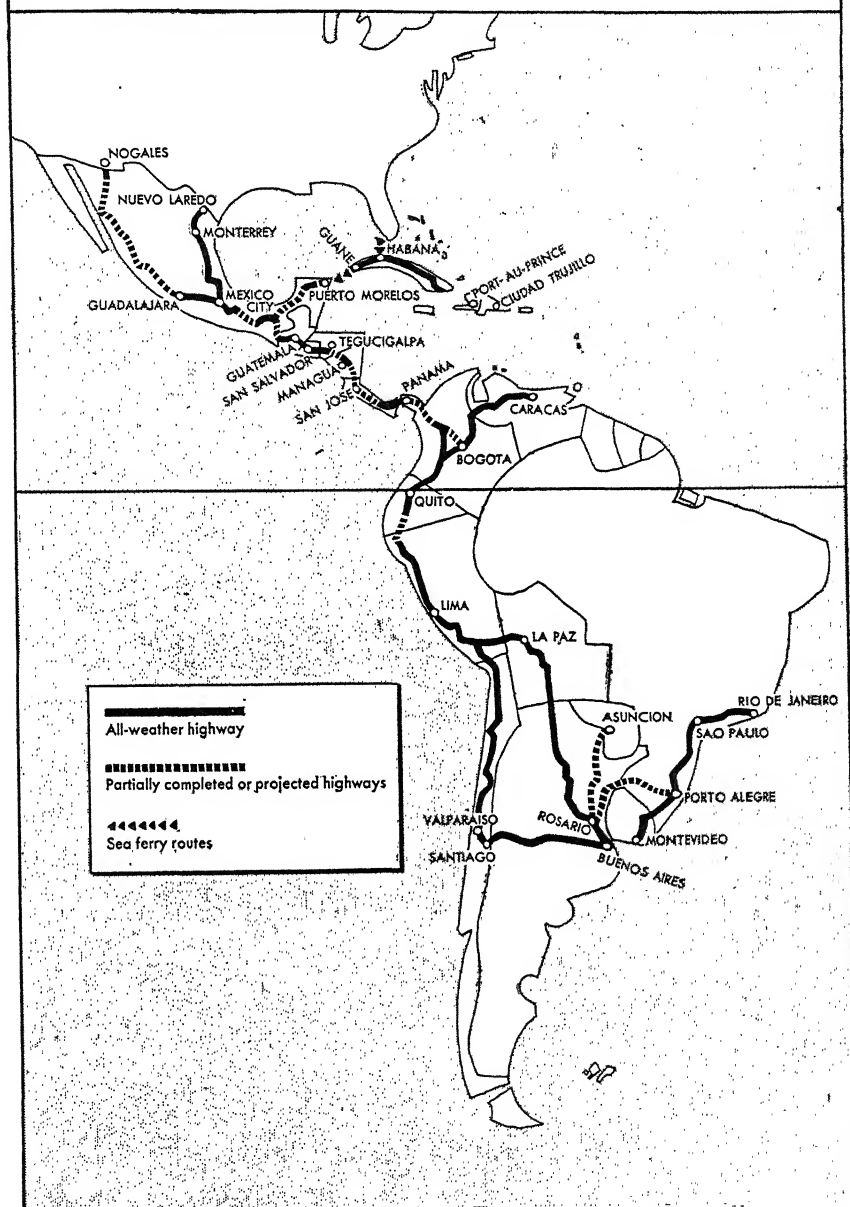
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Percentages indicate proportion of world's production or of exportation.

CENTRAL AMERICA

Central America is an isthmus that connects Mexico with the South American mainland. It has a maximum width of less than 600 miles and narrows in Panama to about 50 miles where the Panama Canal has been cut through. It consists of six republics—Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, and Panama—and the colony of British Honduras. The area is about equal to the combined area of California and Washington states, while the population is less than that of Pennsylvania. Nicaragua is the largest of the republics and El Salvador is the smallest. All six of the republics have joined in the "Declaration of the United Nations" not to make a separate armistice or peace and to employ full military or economic resources against the enemy each is fighting. It is not surprising that they were eager to join in this declaration because they are all small countries capable of approach by sea-borne enemies. They have neither military nor naval forces adequate to defend themselves in case of invasion. They would have to depend upon the protection of their shores by the British fleet or by our navy. Our good-

THE PAN-AMERICAN HIGHWAY



© Foreign Policy Association, Inc.

We must remember that not all the Pan-American or All-American Highway is shown on this map. It extends northward through the United States, Canada and Alaska. This map shows sections in Central America and in northern South America where the road has not as yet been completed.

neighbor policy has overcome to some extent here as well as in all Latin America the fear of the Monroe Doctrine. This doctrine was stated to protect the New World from foreign aggression, not to justify imperialistic designs of our country.

Tropical America. The surface of Central America is in general similar to that of Mexico. There are low, hot plains on either side with highlands between. Because of the disagreeable and unhealthy climate of the lowlands, the inhabitants live chiefly on the uplands where the temperatures are lower and the rainfall is less.

All the countries of Central America lie within the tropics. Foreign nations are interested because of their tropical products and because of the markets offered for manufactured goods. On the hot, rainy plains on the east are banana plantations, financed and managed by Americans and cultivated with the help of Negro labor. Throughout all tropical America the Negro is better able to withstand the heat than the native Indian. There are plantations raising sugar, cotton, and rice on the western plains, and on the plateaus and the low mountain slopes bordering the lowlands coffee is raised. The coffee, which in general is superior to that of Brazil, before World War II was exported largely to the countries of Europe. The United States has been the chief importer of mahogany and other cabinet woods of the tropical forests. In exchange for the products of plantations, mines, and forests Central America has looked to the outside world, especially the United States, for textiles, flour, and petroleum products.

Bananas everywhere. Throughout the year, winter and summer, we see yellow bananas on the shelves of our fruit shops and grocery stores. The sight is so common that we do not give them a second thought. Yet, not more than fifty years ago, bananas were not nearly so common as they are today, and the supply was more or less irregular. In the earlier days of the banana trade it was common for the fruit dealer or the grocer to suspend a large bunch of bananas from the ceiling with the fruit pointing downward and to cut the bananas from the large stem with a curved knife as they were sold. This method is followed in some of the smaller stores even now.

The fruit probably originated in India and gradually moved westward to the Canary Islands and from there to American shores. Bananas have become plentiful in temperate lands as the conquest of tropical diseases has improved labor conditions and as experience has taught methods of handling, ripening, and transporting this per-

ishable fruit. In order to bring the banana to our homes in perfect condition, it must be harvested while green. People who have lived in the tropics say that the flavor of the tree-ripened banana is far superior to that of those harvested while green. Bananas rank high in food value. In the tropics they constitute an important item in the native diet.

Great fruit companies. Before the war we depended for our supply of bananas upon great fruit companies which were at first simply transporters of tropical products. These companies found that in order to have a constant supply of first-class fruit they must supervise its growth and handling. The first small lots were transported in sailing vessels. Boston, New York, and New Orleans were among the first ports to receive large shipments. The companies serving those ports in 1899 united to form the United Fruit Company. This company has extensive plantations in Central America, Cuba, Jamaica, and Colombia. The company employs thousands of people, owns and operates hundreds of miles of railroads in Caribbean countries, and maintains a fleet of steamers which carry the products of their banana, sugar, and cocoa plantations to the United States and Europe. Their steamers known as the "Great White Fleet" carry passengers as well as freight to and from the Caribbean. They have helped to make the Caribbean known to thousands of tourists and to make their stay comfortable by maintaining first-class hotels for their convenience.

After the start of World War II, when it was seen that we must eventually be drawn into the conflict, the Government realized that all available merchant ships would be needed to transport goods and munitions to those who were fighting the Nazi and Fascist menace. In consequence the Great White Fleet was taken over by the Government and civilian transportation to the Caribbean by sea ended. The ships would have been an easy prey for Hitler's submarines that lay in wait along the Atlantic coastal sea lanes and even ventured into the Caribbean where they shelled the oil installations on the Dutch islands of Curaçao and Aruba, off the northern coast of Venezuela. Scores of oil tankers from our gulf ports fell victims to the submarine menace. As a result only the most necessary shipping was permitted, and our merchant ships and tankers were armed with guns for their own protection. Airplanes and blimps patrolled the sea lanes to discover submarines and warn ships of their location. Thus, the commandeering of our ships and the sinkings by submarines have resulted in an absence of bananas and other tropical fruits

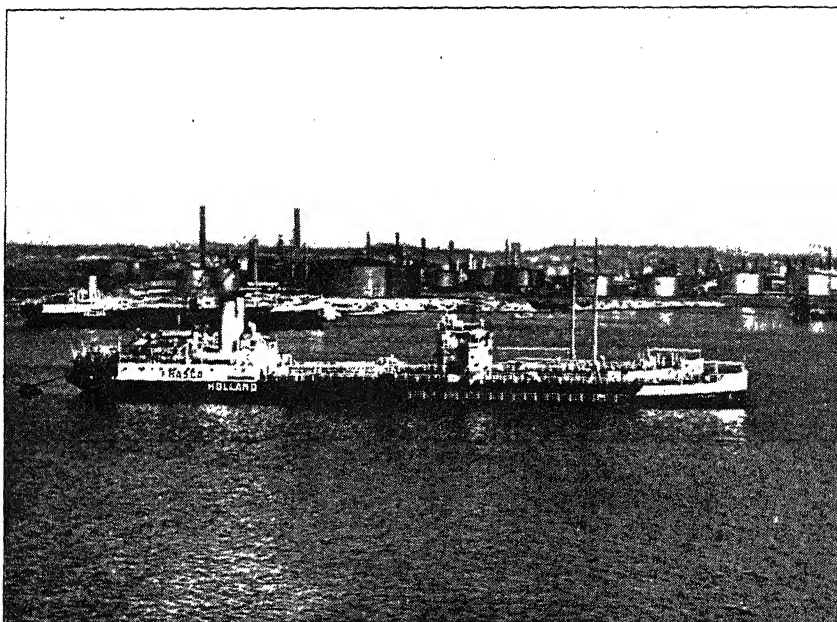


Photo by William LaVarre from James Sawders

Oil tanks and refineries on the island of Curaçao, Netherlands West Indies. The crude oil is brought here from Venezuela. Note the Dutch ship.

from our tables, of crude oil from our furnaces, and of gasoline from our automobile tanks. These privations are the penalty we pay because we have been unable to end wars.

How bananas are grown. In normal times a fruit company selects a large tract of land accessible to a good harbor since the fruit is to be transported by the shipload. There must be a good supply of rain, at least seventy-five inches through the year, to give moisture for the twelve or fifteen months required for growth. The Negro workers first clear the jungle of all underbrush and small trees.

The banana rootstock is then planted in holes about a foot deep and about twenty feet apart. Then the larger trees are cut and allowed to decay where they fall to supply fertilizer for the growing plants. Other groups of workers put up the buildings needed for the workers and the superintendents. Still others lay tracks over which the fruit will be carried to the ship. In the meantime ditches are dug to drain off surplus water. In about three months from the time of planting all weeds and bushes must again be cut to give room and sunlight to the growing plants. This work is repeated several times until harvesttime. There are dangers from floods, but



Photo by James Sawyers

A banana plantation in Guatemala. Here bananas start on their long journey to some American port. Owing to the difficulties of wartime water transportation there have been times when bananas have been entirely absent from our stores.

more especially from strong winds which may lay the whole plantation flat and ruin the crop.

The fruit ripens at all times of the year. As a banana ship approaches the port, the plantation office is notified by wireless, telephone messages are immediately sent to all parts of the plantation, and harvesting begins. The great bunches of fruit which are borne fifteen or twenty feet from the ground are harvested by cutting a gash about halfway up the stem which partially severs it. The fruit is carefully lowered to the shoulders of a waiting workman who carries it to a mule or car to be forwarded to the ship. There endless belts carry the bananas from the wharf to the ship and loading takes place rapidly. Great care is taken not to bruise the fruit at any time and while on the ship refrigerating plants maintain an even temperature of about 57° F. Upon its arrival at a northern port railroads carry the fruit to all parts of the country. The United States has been the greatest consumer of bananas, but the fruit has been shipped to all countries of Europe, to Canada, and even to Alaska.

THE WEST INDIES

The West Indies practically surround the Caribbean on the north and east. Cuba, Jamaica, Hispaniola, and Puerto Rico make up the Greater Antilles. The Lesser Antilles consist of groups of islands lying at the eastern end of the Caribbean Sea. These are the Windward and the Leeward Islands. To the north of Cuba are the Bahama Islands. Most of the islands of the West Indies are possessions of the United States or other great powers. Puerto Rico and the Virgin Islands of the United States belong to us. Cuba, Haiti, and the Dominican Republic are all self-governing. Jamaica, the Bahamas, and other small islands are British. The remaining small islands are possessions of the French or the Dutch.

Products and markets. These islands are of value to the countries of temperate lands in several ways. They serve as naval bases and as fuel stations both for naval and merchant vessels. Their cane sugar, tropical fruits, and tobacco find a ready market in northern markets. Sugar and banana plantations and mineral deposits are developed and managed mainly with foreign capital. Like most other tropical regions they furnish a good market for a variety of manufactures. Some of them, such as the Bahamas, are popular winter resorts for the people of North America and Europe. Ships conducting vacation cruises make brief stops at many of the Caribbean ports, but such cruises are out for the duration.

Cuba. The most important island of the West Indies, Cuba, is about the size of Tennessee. It has a population almost 50 per cent larger than that state. About three fourths of the inhabitants are white people. Spain surrendered the island to the United States as a result of the Spanish-American war (1898). It became a republic on May 20, 1902, when the control of the island was transferred by the United States to the newly elected Cuban government.

This island is noted for the production of sugar, and much of the sugar consumed in the United States has come from there. Tobacco is another important crop of the island, normal production being about 65,000,000 pounds. The soil of the western part of the island gives an aroma for which Cuban tobacco has long been famous. Cigarmaking is one of Havana's important industries. Much tobacco leaf has been exported however, and many so-called Havana cigars are manufactured in the United States. More than one fourth of Cuba's tobacco crop usually comes to the United States. The city of Tampa with scores of cigar factories, many of them oper-

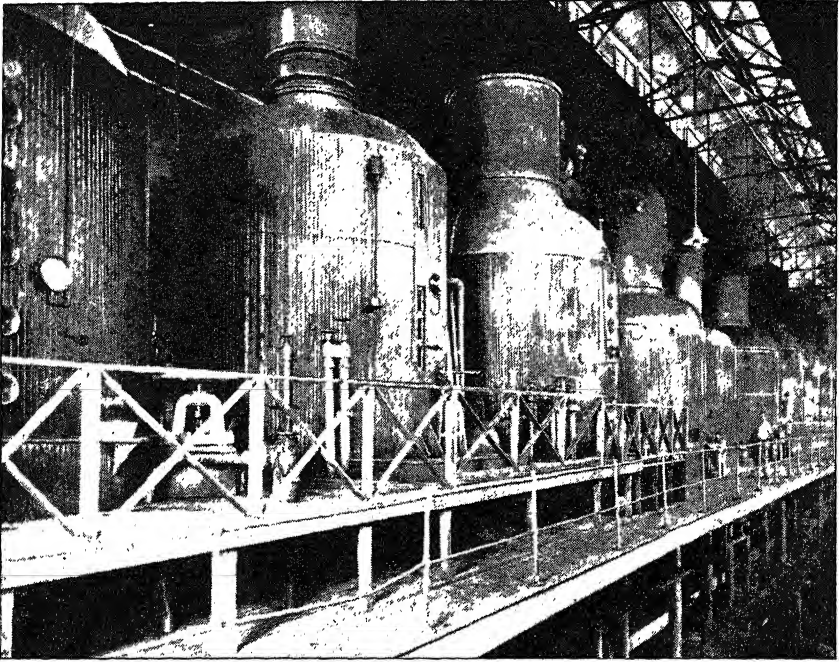


Photo from Ewing Galloway

A sugar mill in Cuba. A row of vacuum tanks in which the liquid is evaporated at a temperature below the usual boiling point. In this way the sugar is not allowed to caramelize.

Trinidad and Jamaica are possessions of Great Britain. Only about two per cent of Jamaica's population are white. Jamaica produces bananas and many other tropical fruits, sugar, coffee, cacao, and coconuts. Trinidad produces cacao, sugar, coffee, and coconuts. Natural asphalt from Trinidad's famous pitch lake is widely used for roadbuilding and other purposes.

CARIBBEAN SOUTH AMERICA

Colombia, Venezuela, and the Guianas all border the Caribbean. No portion of any one of them is more than 12° from the equator. Colombia is crossed by that line and the southern borders of Venezuela and the Guianas come within two or three degrees of it. For this reason the lowlands are hot and in rainy seasons very wet and unhealthful. The few white people live in the highlands where the climate is more agreeable. The great majority of the inhabitants are Indians, Negroes, and those of mixed race.

Colombia. This country named after the discoverer of America,

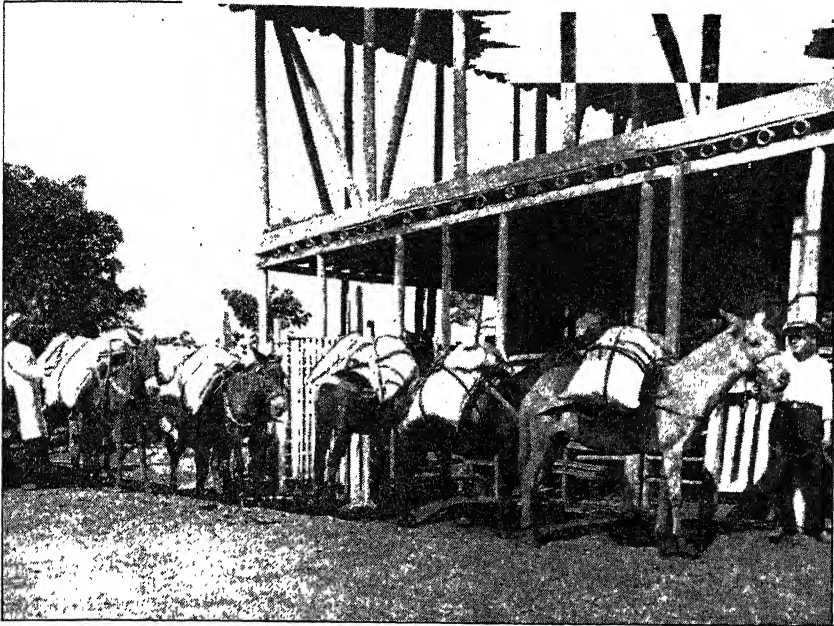


Photo by James Sawders

A pack train of mules in the highlands of Colombia. This primitive method of transportation must be used through mountainous country to carry coffee to the port for export.

is about the size of Texas, Oklahoma, and New Mexico taken together. Its population is a little smaller than that of Pennsylvania. Colombia lies entirely within the tropics. The temperatures are generally high except where they are moderated by high altitudes, as in the Andes Mountains, by the northeast trade winds, or by the cold ocean current off the western coast. The highest temperatures are along the Caribbean, in the valley of the Magdalena River, on the eastern slopes of the Andes, and on the *llanos*, or level grassy plains. The annual rainfall is heavy. The precipitation on the west coast is over 72 inches resulting in tropical jungles and swamps. Wet and dry seasons alternate over most of the country, but east of the mountains there are dry areas.

Colombia, conquered and ruled by Spain for 300 years, won its freedom in the revolt of the Spanish-American colonies (1811-1824). The liberator, Simon Bolívar, the "George Washington of South America," established the Republic of Colombia in 1819.

In this country the Andes run in three nearly parallel ranges in a general north and south direction. Between the ranges are plateaus and broad valleys. The great eastern plain lies in the basins

of the Amazon and Orinoco Rivers. Much of the soil of the country is extremely fertile, but only a small part is under cultivation. There is a considerable livestock industry. Cattle, sheep, hogs, and horses are extensively raised. On the foothills of the mountains are many plantations where coffee, the chief crop of the country, is raised. In quality it is considered superior to that of Brazil. Coffee has usually made up more than one half of the exports of the country, the most of which has come to the United States. On the low plains at the north the United Fruit Company has large areas devoted to the growing of bananas. Nearly half the crop has been shipped to the United States and the rest to European countries. Other important crops are tobacco, sugar, cotton, corn, and wheat.

The minerals of Colombia rank next to its agricultural products in value. Under the rule of Spain millions of dollars' worth of gold was taken away in Spanish galleons. Even today gold next to petroleum is Colombia's most valuable mineral product. Colombia is excelled only by Canada and Russia in the production of platinum. Some years ago the streets of one of Colombia's towns were dug up in the search for this rare metal. It is obtained mostly by dredging from river gravels. The United States has obtained its supply of platinum chiefly from Great Britain and Colombia. Great Britain has gotten its supply by refining Canadian ores.

Petroleum is produced in the Magdalena Valley by an American Company. Much of it is shipped to the United States. Since there is little manufacturing in Colombia, the country has to import a great variety of manufactured goods. The United States has supplied cotton textiles, machinery, radios, automobiles, buses, and equipment necessary for plantations, oil wells, and mines.

Tropical forests yield many valuable products. Rubber trees grow wild. Cinchona and Copaiba trees furnish valuable medicines.

The country has a little less than 2000 miles of railroads. Much of the transportation within the country is by river and on muleback. The Magdalena River in western Colombia is navigable for river steamers for almost 1000 miles from its mouth. Twenty-four air lines cover 9280 miles of routes. There is adequate airplane service from Colombia to the United States. The overland journey from the Caribbean coast to the capital, Bogotá, requires a week. The same distance could be traveled in the United States in twenty-four hours.

Venezuela—a state without a public debt. Like Colombia, Venezuela obtained its freedom from Spain in 1811 under the leader-



Photo by James Sawyers

Mahogany logs awaiting shipment at the Colombian port of Buenaventura. Mahogany is a product of tropical climates.

ship of Bolívar. In 1830 it set up a separate government and has maintained its independence ever since. The government was very unstable for almost a century due to frequent revolutions. In December, 1908, a strong military leader, Juan Vicente Gomez, was chosen as President. He ruled the country with an iron hand, becoming virtually a dictator. He held office as chief executive until 1929. Although reelected in that year, he refused to assume the office on the ground that his mission had been accomplished. However, he accepted the post of commander in chief of the army, believing that the armed forces under an able commander were the best security from turmoil and revolutions. During his term of office he had paid off the entire national debt, had put down uprisings, and had favored the investment of foreign capital in developing the country's resources. He exercised his power for peace and prosperity in Venezuela until his death in 1935.

The country has a great variety of surface and climate. In the northwest the Andes enter the country and extend eastward along its northern border. Two of the ranges surround the low, hot plain in which Lake Maracaibo lies. East and south of the mountains are

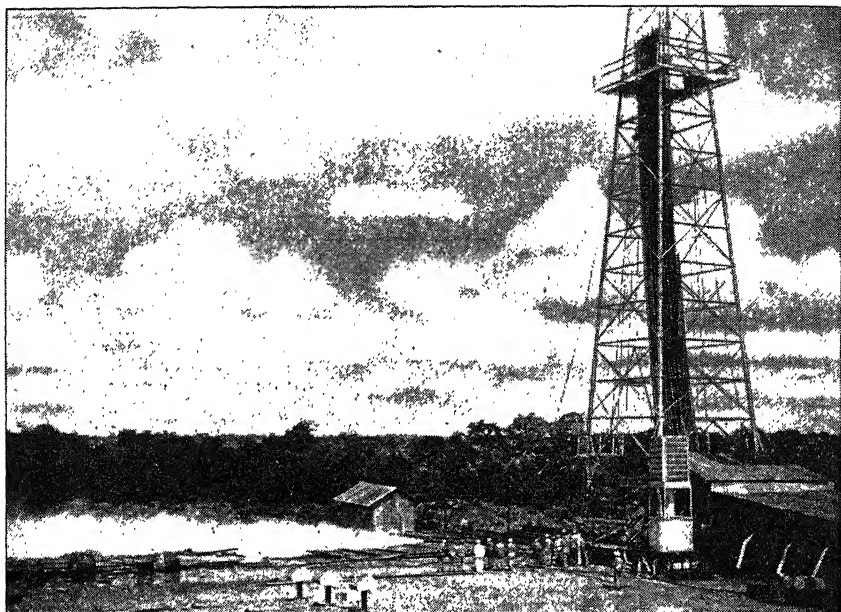


Photo from Triangle Photo Service

A Socony well in a Venezuelan oil field. Oil has been struck and gas and oil are escaping under high pressure.

the great prairies, or *llanos*. Here is an opportunity for a much greater development of cattle raising. Extending southward from the *llanos* are low mountains.

Although agriculture is the leading occupation of the people, the value of production is not great for a country larger than Texas and Oklahoma combined. Coffee and cacao beans are the principal money crops. Venezuela stands third in the production of petroleum following the United States and Russia. Much of the petroleum is shipped from the wells in the Lake Maracaibo district to the island of Curaçao (belonging to the Netherlands), where it is refined and the products exported. It was the exportation of oil that enabled Gomez to pay off the national debt.

Venezuela, being an agricultural country, can largely feed its people and produce a surplus of many tropical products for export in peacetimes. These surpluses have been used in the past to purchase commodities that are needed but are not produced because of lack of manufacturing facilities.

Its imports are similar to those of other Caribbean lands. They include cotton textiles, foods, equipment for oil wells, automobiles, and trucks. The country is building some excellent highways. One

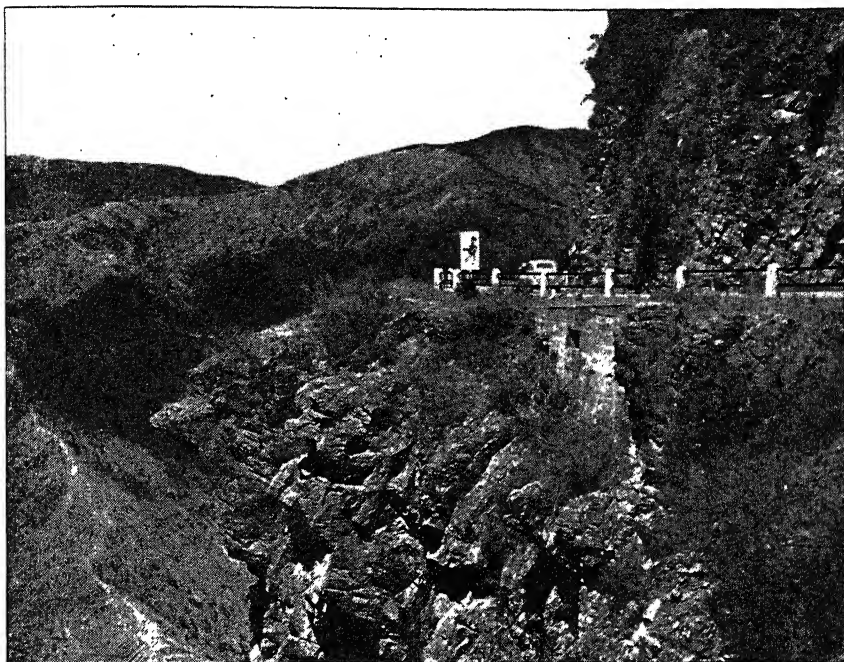


Photo by James Sawyers

Along the highway between La Guaira and Carácas. As in all mountainous countries the roads and railroads follow the passes or gaps in the mountain ranges. To follow such a course and thus avoid the steeper slopes means a roundabout route often more than twice the distance of an airline.

of these runs westward to the Colombian border over Andean passes 14,000 feet in height.

There are some 5000 miles of motor roads in Venezuela, and others are projected. Only about 700 miles of railways have been built. They are chiefly in the neighborhood of Carácas, the capital, and the northern coast. Still much of the country is accessible only by mule paths, and goods are transported by man power or pack animals. River boats are extensively used on the Orinoco and its tributaries. This river system drains about four fifths of the country. The Orinoco, the third largest river of South America, is navigable for about 1000 miles. Air-transport service has been extended to Venezuela since 1929. In that year a powerful beacon light to guide night fliers was set up at San Juan. Its beams can be seen for 300 miles. Airplanes fly from Miami, Florida, via the Canal Zone to the chief coast cities of Colombia, then on to Maracay about 75 miles west of Carácas.

The Guianas—British and French—and Surinam. These countries are the only portions of the South American continent

that are not self-governing. France has used its possession as a penal colony since 1883, but popular opinion at home will probably lead the government to discontinue the practice of sending criminals to Devil's Island when the war is over.

The low plains of the coast yield sugar cane, rice, cacao, bananas, and coconuts. Immense forests of valuable timbers are almost untouched. The plateau to the south has not been fully explored. Bauxite, the ore of aluminum, is mined and exported from both British Guiana and Surinam. Gold, manganese, and diamonds are other mineral products. The trade has been largely with the governing countries.

In 1940 a site in British Guiana on the Demerara River, 25 miles from the sea was leased to the United States for a defense base by the British along with other British bases in exchange for fifty over-age destroyers. The Netherlands government likewise gave permission for the establishment of a military outpost in Surinam. It was established in 1941 under a sharing arrangement between Brazil and the United States. These bases form part of the outer defenses of the Panama Canal.

In March, 1943, French Guiana renounced its allegiance to the Nazi-controlled Vichy government and aligned itself with the North African government of General Giraud, thus joining the side of the United Nations. The French Committee of National Liberation under General de Gaulle now represents the new French government.

GUIDES TO STUDY

1. Why was a region in the New World known as the *Spanish Main*?
2. How does the treasure of the region today differ from that of olden days? Why?
3. Why is the United States interested in Central America?
4. Why were the Central American republics eager to join the United Nations?
5. Compare the surface and the climatic regions of Central America with those of Mexico.
6. Describe the work necessary to raise bananas and prepare them for distant markets.
7. Why were but few bananas sent to the United States for many months after the outbreak of World War II?
8. Why is the banana industry under the control of large companies?
9. Why are nearly all the islands of the West Indies under the control of foreign countries?
10. Of what value are the islands to the people of temperate lands?
11. Why is Cuba's trade very largely with the United States?
12. What are the chief resources and industries of Caribbean South America?

13. What resources of the region are developed by foreign capitalists and what ones by the inhabitants? Account for the differences.

TOPICS FOR CLASS DISCUSSION

1. The relation of surface to climate in Central American countries.
2. Trade between tropical and temperate regions.
3. Transportation in Caribbean South America. Why is it difficult?
4. Curaçao and Aruba.
5. French control in the West Indies and in Caribbean South America.

WORK TO BE DONE

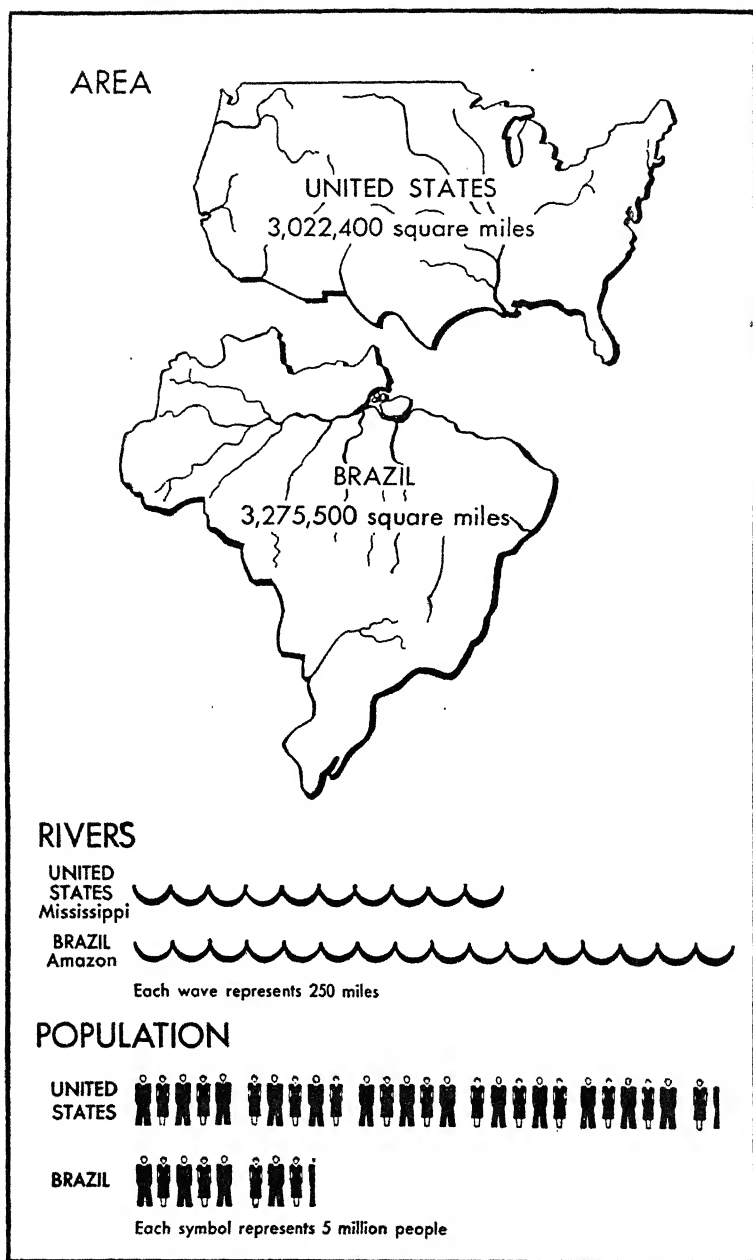
1. On an outline map of the Caribbean region print the names of all countries and the larger islands. Locate and print the names of principal cities.
2. Why is there more rainfall on eastern coasts than on western?
3. Make a special study of the conquest of malaria and yellow fever in the Caribbean region.
4. Collect pictures or make simple drawings of the work on banana plantations.
5. Make a list of products of Caribbean lands which come to the United States; another list of products which those lands receive from the United States.
6. What is the "Monroe Doctrine"? Why do we insist on its observance?
7. What is meant by Pan-Americanism? Make a brief report of the importance and necessity of this movement.
8. Select one of the Central American republics for special study with reference to the kind of country, its climate, its peoples, its products, and its trade. Also its methods of transportation and communication.
9. Do the same for one of the larger islands of the West Indies.

4. BRAZIL—A STRONG LATIN-AMERICAN ALLY

THE WORLD'S GREATEST COFFEE GROWER

The United States of Brazil. Brazil is the largest country in South America. It comprises almost half of that continent. It exceeds in area the 48 states of the United States by 250,000 square miles. It extends from east to west 2694 miles and 2676 miles from north to south. Its coast line on the Atlantic Ocean measures almost 5000 miles and has many good harbors. Notwithstanding its vast ocean border, it is interesting to know that Brazil touches ten of the twelve countries of the continent, Chile and Ecuador alone having no common boundary with it.

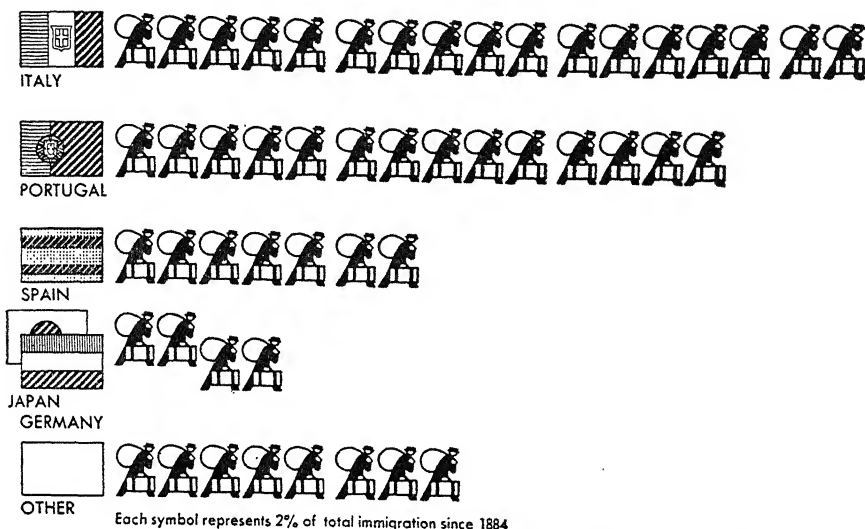
Brazil was discovered by Pedro Alvares de Cabral, a Portuguese navigator, in 1500. It was developed as a Portuguese colony. In 1807 the royal house of Portugal fled from Lisbon at the approach



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Compare the areas of the United States and Brazil. Then compare the populations of the two countries. Explain.

MAJOR SOURCES OF IMMIGRATION SINCE 1884



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What conditions in European countries have led many people to come to Brazil?
What advantages did they find there?

of Napoleon's army, and the seat of government was transferred to Rio de Janeiro, where it remained for fourteen years. In 1815 Brazil was proclaimed a kingdom. In 1822 Dom Pedro, son of King John VI, was crowned constitutional ruler of the Empire of Brazil, and Brazil proclaimed its independence of Portugal. After nine years, Pedro I, as the emperor was called, abdicated in favor of his five-year-old son, Pedro II, who at the age of fifteen became emperor. Pedro II ruled beneficently for 48 years, one of his most notable deeds being the emancipation of the slaves. In 1889 Pedro II was driven from the throne by a revolution, and a republic was set up. In 1891, a constitution modeled on that of our country was adopted. Since that time numerous revolutions have occurred. In 1930 Getulio Vargas became provisional president as a result of a revolution. He became constitutional president in 1934 after a new constitution had been provided. This document was suspended in November, 1937, when Vargas became virtual dictator.

Brazil, under President Vargas, has responded to the good-neighbor policy of our Government. The two nations have co-operated in their war efforts. In 1940-1941 the United States gave Brazil economic and financial assistance and pledges of military aid. Brazil declared war on Germany and Italy on August 22, 1942, and

was influential in lining up other South American countries on the side of the United States.

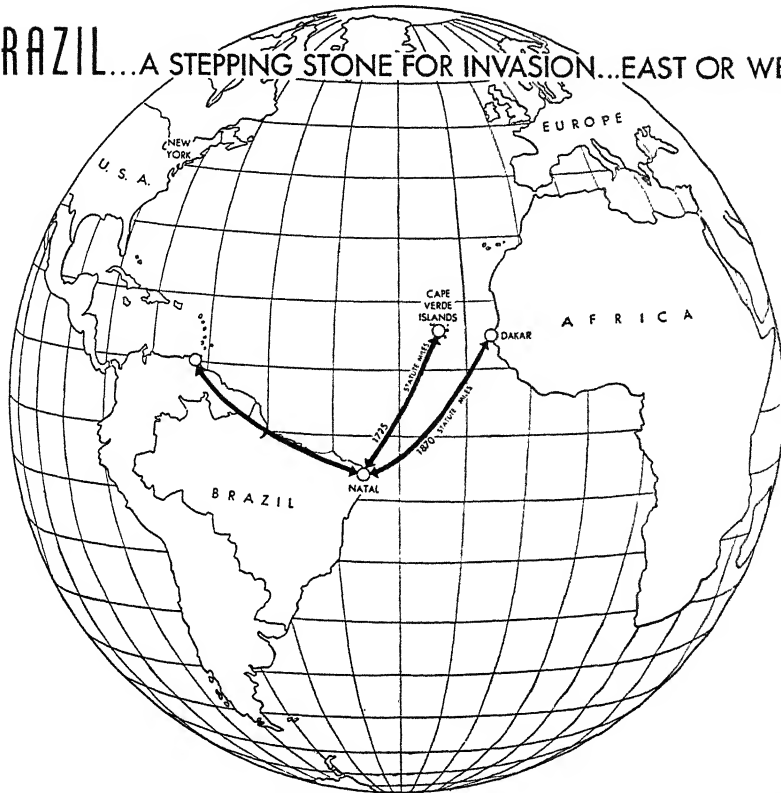
Potential fifth columnists. Unfortunately for Brazil the chief immigrants to that country have come from Axis countries. There are large colonies of Germans, Italians, and Japanese as well as thousands of Spaniards whose homeland is a Fascist country. These various people are not scattered through the population but have settled in groups where they preserve the customs and cultures of their motherlands and speak their native tongues. Hitler and his Axis partners expected these groups to rise up and aid him in his projected invasion of the southern continent. No doubt many of them were prospective "fifth columnists" and have acted as spies. Many could be counted upon as saboteurs, and all would have aided an Axis invading force.

Brazil's threat from Dakar. For a long time there was great fear in Brazil as well as in all the United Nations that the Axis would seize Dakar in French Senegal in Western Africa in order to secure a base from which an air and sea attack could be launched against Brazil. Dakar, a strong military and naval base, is only about 1900 miles from Natal in Brazil, a distance that could be covered by an air armada in a few hours. Fortunately the successful Allied invasion of North Africa forestalled Hitler's attempt to persuade the Vichy government to allow the Axis the use of Dakar as a base. When the French government in North Africa finally turned over Dakar to the Allies, a great threat to Brazil and to North and South America was removed. The strong hand of President Vargas has controlled the Nazi and Fascist elements in Brazil's population.

The country and its people. When first visited by Europeans, the chief product sought was brazilwood. This wood which gave the country its name was so called because of the red dye obtained from it. Vessels came in fleets from France and Spain to procure it for European markets. Coal-tar dyes have taken the place of vegetable dyes; so brazilwood no longer stands high among Brazil's resources.

The principal physical features of Brazil are the lowlands of the Amazon Valley and the eastern plateau bordered by low mountains. The climates of Brazil vary with latitude and elevation. The Amazon Valley lies in the equatorial calm belt with its intense heat and heavy rainfall at nearly all times of the year although some seasons have much more rain than others. The eastern plateau has less rain and is much cooler because it is farther from the equator and because

BRAZIL...A STEPPING STONE FOR INVASION...EAST OR WEST



Pictograph Corporation for the Coördinator of Inter-American Affairs

of its height. More than nine tenths of the inhabitants live on the eastern highlands. The southern part of the highlands has a temperate climate with products similar to those of our Central States. West of the central highlands are great stretches of grassy plains, called *selvas*, well adapted to the raising of cattle.

Products of the Amazon Valley. Until 1913 the valley was the world's chief source of rubber. It now produces only about one third as much as in 1913 and less than two per cent of the world supply. The carnauba palm provides many useful products among which are sugar, starch, fibers for rope and hats, and carnauba wax used for making candles and shoe polishes and for glazing paper. The United States imports more than \$4,000,000 worth of this valuable wax in a normal year. Brazil nuts are gathered by native Indians and are exported in large quantities. Valuable woods of the Amazon forest are mahogany, rosewood, and ebony. Transportation is extremely difficult and the trees of a single species are widely scattered.



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What do the plant products tell of the climate of different sections of Brazil?

Resources and commercial products. The resources of the Amazon Valley are products of the forests. On the eastern plateau the one great crop is coffee. Cotton, tobacco, and sugar cane are grown over large areas of the country and the possibilities for the production of each is almost unlimited. Corn is raised in every state of Brazil. The country has extensive plains with abundant grass for grazing cattle. There is a great variety of mineral deposits including gold, manganese, and iron.

Coffee. The greatest coffee-producing area is on the plateau near the tropic of Capricorn. Although soil, land surface, and climate are almost ideal, frosts do sometimes occur and do great damage. About twenty years ago a severe frost did great harm to both crop and trees. Immediately the price of coffee in the world's market

was doubled. Each year as harvesttime approaches, coffee dealers the world over are interested in Brazilian weather. A frost in Brazil may increase the price of a pound of coffee anywhere in the world.

Our favorite breakfast cup. Coffee was first introduced into Europe about four hundred years ago by the establishment of a coffeehouse at Constantinople. So popular did the new beverage become that within a century coffeehouses were thriving in all the large European cities. The first London house was opened by a Greek in 1652. Since then the use of coffee has become so widespread that today nearly every civilized home, if not a coffeehouse, is most certainly a coffee-using home. Here in the United States we use more coffee than any other country. The average consumption is more than one pound a month per person. The Swedes are great coffee drinkers too. Their average consumption is higher than ours, but, as the population of Sweden is less than that of the United States, their total consumption is less than ours. In England the average quantity of coffee consumed in a year is less than a pound per person. The British are tea drinkers.

Where coffee is grown. In earlier days, when the housewife bought the coffee bean and ground her own coffee in home grinders, many used Mocha coffee exclusively. Others were ardent users of Java coffee; still others insisted on a blending of the two. Now with the widespread use of trade names we insist on using our favorite brand which, whether of the Mocha or Java type, probably comes from Brazil. The coffee tree is supposed to be a native of Ethiopia. About three hundred years ago plants were taken from Mocha in Arabia to Java. From Java trees were taken to the botanical museum in Amsterdam. From Amsterdam a tree was sent to the botanical garden in Paris. The Dutch introduced the plant in Surinam (Dutch Guiana) in 1714. In 1720 Gabriel Mathieu de Clieu, a French officer, sailed from France for the West Indies and carried with him three young coffee plants. His vessel encountered a violent storm and the voyage was greatly prolonged. The food was exhausted and water rationed daily to the passengers and crew. The French officer voluntarily deprived himself of his share of the water and used it to try to keep alive the three plants. By his self-sacrifice he was able to reach Martinique with one of three plants still living. The climate of Martinique proved to be so well adapted to the culture of the coffee tree that in a short time trees were available for all the West Indies from this island and from Surinam. From the West Indies it was introduced to the mainland of South America. From Surinam

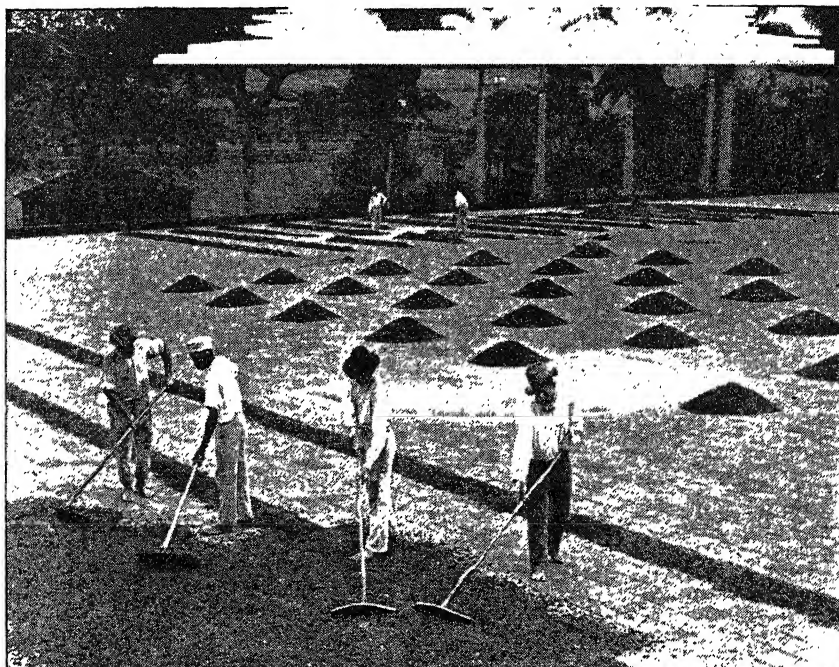


Photo from Monkmeyer Photo Service

After the pulp has been removed from coffee berries, the beans are thoroughly washed and then dried in the sun. In case of damp or rainy weather the beans are protected by a canvas covering. The drying process may take from one to two months.

coffee found its way to French Guiana and thence to Brazil. The first cultivation in Brazil was at Belem in Pará state in 1727.

What the coffee plant needs. Nearly all of the coffee-producing areas lie between the tropic of Cancer and the tropic of Capricorn. This makes its production possible in every continent except Europe. Presumably it could be grown over much larger areas than it is, provided the proper temperature, rainfall, elevation, and soil conditions can be found together. Both the coffee tree and its fruit require a hot climate with plenty of rain during the growing season and dry sunshiny weather for harvesttime. Since it does not like wet feet, it grows best in rolling country where land drainage and air drainage are good. In other words, it thrives best in tropical uplands where these conditions exist and where there is little or no danger of frosts. In the Brazilian coffee-growing region frosts do sometimes occur, but not frequently enough to discourage its culture.

Brazil, the adopted land of coffee. In the southern part of this country near the Atlantic Ocean there is an extensive plateau region covered to a great depth by a rich soil of decomposed volcanic rock.

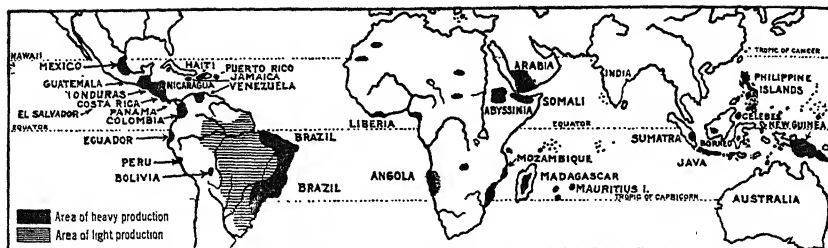
So vast is this area and so nearly ideal the conditions that Brazil could easily raise enough coffee to supply the whole world. Coffee is grown over an area about equal in size to that portion of our country east of the Mississippi River. São Paulo, a southern state, produces the largest quantity. In many coffee-growing regions blossoms and both green and ripe fruit may be borne on the trees at the same time. This complicates the harvesting. In São Paulo the cold and the dry seasons come together, causing the berries to ripen evenly and making harvesting much easier.

Preparation for market. In a wild state coffee trees grow to a height of twenty feet, but for purposes of cultivation they are kept down to a height of ten or twelve feet. When four or five years old, they begin to bear fruit. The fruit is a pulpy "cherry" somewhat like a cranberry. In the heart of each cherry are two seeds, or *beans*, rounded on the outside but flat where they come together. In order to remove these beans from the cherry, the fruit must first be soaked and then put through a pulping machine to remove the skin and pulp. The beans are then partially dried and put through a second machine to remove the parchment, or paperlike, covering which incloses them. They are then ready for the final thorough drying in the sun, or by artificial means, after which they are packed in bags of 132 pounds each, ready for storage or shipment. It is said that the coffee-carrying railroad from São Paulo to Santos has been the best-paying railroad in the world. Rio de Janeiro ranks second to São Paulo in the exportation of coffee.

Coffee is an almost imperishable crop and under proper conditions may be stored for months or years. The wealth derived from the industry has done much to promote the growth and prosperity of the near-by cities of Rio de Janeiro and São Paulo.

The coffee plantation. As a large plantation, or *fazenda*, calls for the labor of many hands, there are settlements of several thousand persons on a single plantation. Many fazendas have several hundred thousand producing trees as well as large acreages for growing food crops for workers. They also produce livestock for meat. Most of the large plantations are self-sufficient communities as far as supplying the wants of the workers is concerned. They also have their own churches, schools, places of recreation and amusement, gristmills, flour mills, blacksmith shops, leather-working shops, vehicle building and repair shops, and stores where articles of merchandise may be bought.

The work of harvesting and marketing must be done very care-



Courtesy Brazilian-American Coffee Promotion Committee

Coffee-producing regions of the world

fully. Much of the modern machinery used comes from the United States. As on the large sugar plantations, many coffee planters have their private railroads.

Our chief source. We have been Brazil's best coffee customer. Of the more than a billion and a half pounds that we import every year about two thirds comes from that country. The Brazilian planter bases his crop on our market. If at any time this source of supply should be cut off, it would take the combined crop of the rest of the world to supply our needs. We have imported a very small quantity of coffee from the Netherlands Indies and varying quantities from Venezuela, Colombia, El Salvador, Guatemala, and Mexico. The coffee grown in these countries has a milder flavor than that grown in Brazil; hence it is desirable in blending coffee for fine flavor.

Overproduction. Brazilians found the coffee industry so profitable that the supply tended to be greater than the needs of the world markets. Large sums were spent in advertising coffee in America and Europe. Even then prices continued to fall and the state of São Paulo attempted to limit output by discouraging new plantings. Coffee was also held in storehouses throughout the coffee-producing region and was permitted to move to the markets only when the price was high enough to yield a profit. These methods helped for a time to keep prices at a higher level because Brazil produces so large a part of the world's crop. In recent years, however, all efforts to keep up prices have failed, and the government has decided to remove all restrictions and to yield to the law of supply and demand.

The Inter-American coffee-quota system. The global war has changed the coffee situation of the world. Lack of shipping space and submarine sinkings have greatly limited Brazil's exportation of its chief money crop. The United States—the largest buyer—had supplies so reduced as to necessitate the use of a rationing plan that greatly diminished consumption.



Photo from Ewing Galloway

A cotton field in the State of Sao Paulo in southeastern Brazil. The country provides all its own needs both for raw cotton and for manufactured goods.

Under an agreement signed in Washington on November 28, 1940, the United States market was divided on a quota basis among the fourteen South American, Central American, and West Indian producers. Under this system Brazil's share was fixed at 9,300,000 bags, or 58.49 per cent, as a yearly export allotment. Of course, not all this coffee can be shipped under present conditions, and much of it will be paid for by our country and will be stored till after the war.

It has had the effect of putting the industry on a sound basis and restoring the morale of the coffee producers. The quality of the coffee produced has been improved, undesirable surpluses have been destroyed, production is geared to exports, and research is being made as to possible other uses of coffee. One promising result of this research which would utilize poor grades of coffee and the surpluses is the production of "Caffelite," a plastic material. The process of obtaining the powder which constitutes the plastic is said to be very simple in comparison with other industrial methods. It consists in forcing into a resinous state some substances in the bean after the oil and caffeine have been extracted. It may be used for all sorts of molded articles. It will find many uses in the radio, automobile, and airplane industry in competition with other plastics. In the building



Photo from Ewing Galloway

A sugar plantation near Sao Salvador (Bahia), Brazil. For more than a century Europe looked to Brazil for the most of its supply of sugar. In later years the Brazilian markets were lost to producers of beet sugar and to other cane-growing regions.

industry it will replace other materials or be used in conjunction with them as a coating to furnish a more attractive surface, as in ceilings and floors. The plant where this plastic is manufactured is located in São Paulo.

Cotton. This fiber is native to Brazil and was used by the Indians before the coming of white men. The climate is suitable for cotton all the way from the state of São Paulo to the Amazon Valley. In recent years the Japanese, the greatest consumers of raw cotton, have been deeply interested in Brazil's cotton crop. Of the 200,000 Japanese in Brazil many are engaged in growing cotton. Cotton planters in the United States are concerned to see that Brazil is gaining markets formerly supplied with American cotton. The annual yield in Brazil is three and a half times as large as it was ten years ago.

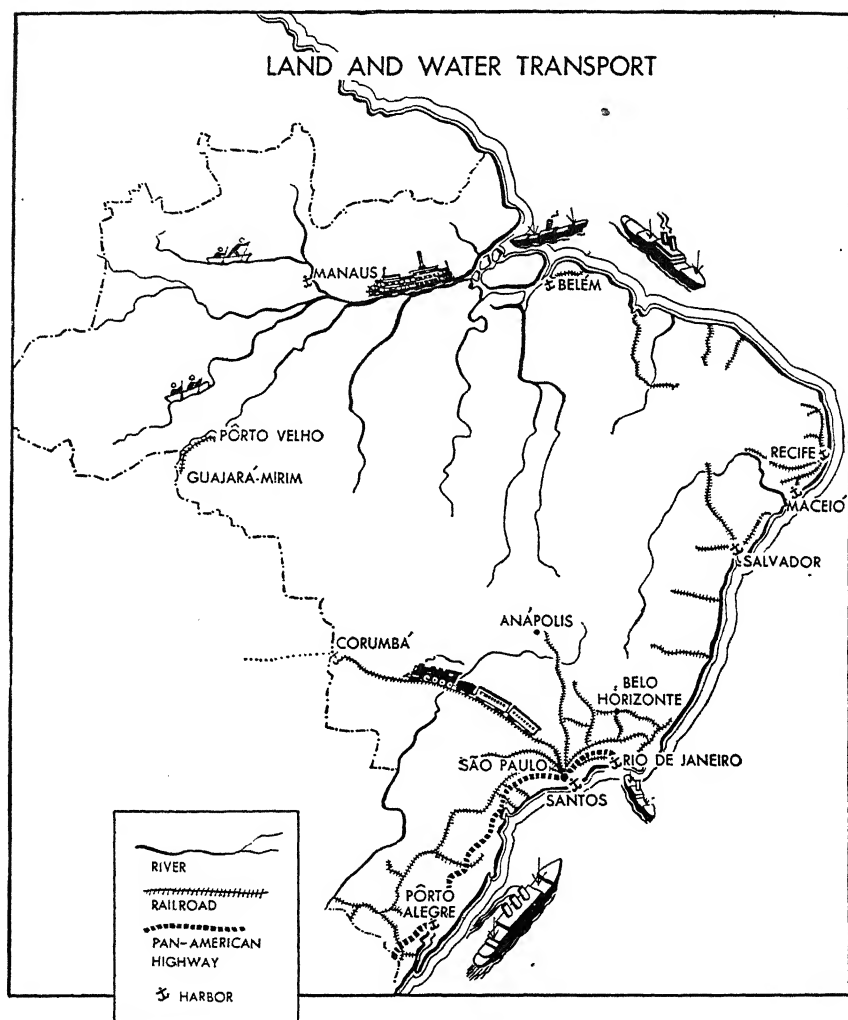
Other Brazilian farm products. For more than a hundred years European countries looked to Brazil for their supply of cane sugar. But the increase in the plantings of cane in the East and West Indies and the rapid spread of the beet-sugar industry greatly reduced the markets for the sugar of Brazil.

Tobacco was used by the Indians in South America before the days of Columbus just as it was in North America. The principal tobacco-growing region of Brazil is near the port of São Salvador (Bahía). Other agricultural products raised in quantities sufficient for export are rice and oranges.

Raising cattle for beef. The high plains of the state of Mato Grosso offer almost unlimited grazing lands for cattle. But in the warm, moist climate the cattle suffer from diseases and insect pests to an extent not known in more temperate lands. Cattle immune to disease have been imported from India, but the meat is much less desirable than that of European stock. Blooded stock has been imported from the United States and Europe to improve the Brazilian herds. The first meat-packing plant was established in 1913. Recently the value of the animal products exported has been exceeded only by that of coffee and cotton. Besides cattle the country supports millions of swine, sheep, and goats.

The minerals of Brazil. Until the discovery of the diamond mines of South Africa, Brazil was the chief source of diamonds. The country yields a small number of gems of fine quality but a much larger number of black diamonds, called *carbonadoes*. The black diamonds are used on drills for cutting rock and on other tools for cutting or turning hard substances. Brazil has vast deposits of iron ore that have yet hardly been touched. With an eye to future needs British and American capitalists have acquired ownership of a large part of the deposits. Greater demand for steel and better means of transportation will no doubt lead to the working of these rich resources. The lack of coal suitable for making coke is still another reason for the slight progress of Brazil's iron and steel industry. Few countries possess manganese in any large quantity. Brazil is one of the lucky few and manganese for making steel finds its market mainly in the United States.

Industrial Brazil. Manufacturing is handicapped by lack of good coal and by poor transportation facilities. Limited means of transportation leads to production on a small scale in widely separated parts of the country. The more difficult it is for a region to exchange goods with other parts of the world, the more nearly self-sustaining that region must be. São Paulo leads all other states in manufacturing as it does in nearly all the country's activities. The great output of coffee gives it better connection with other parts which in itself is a stimulus to greater and more efficient production. The spinning and weaving of cotton takes the lead in Brazilian indus-

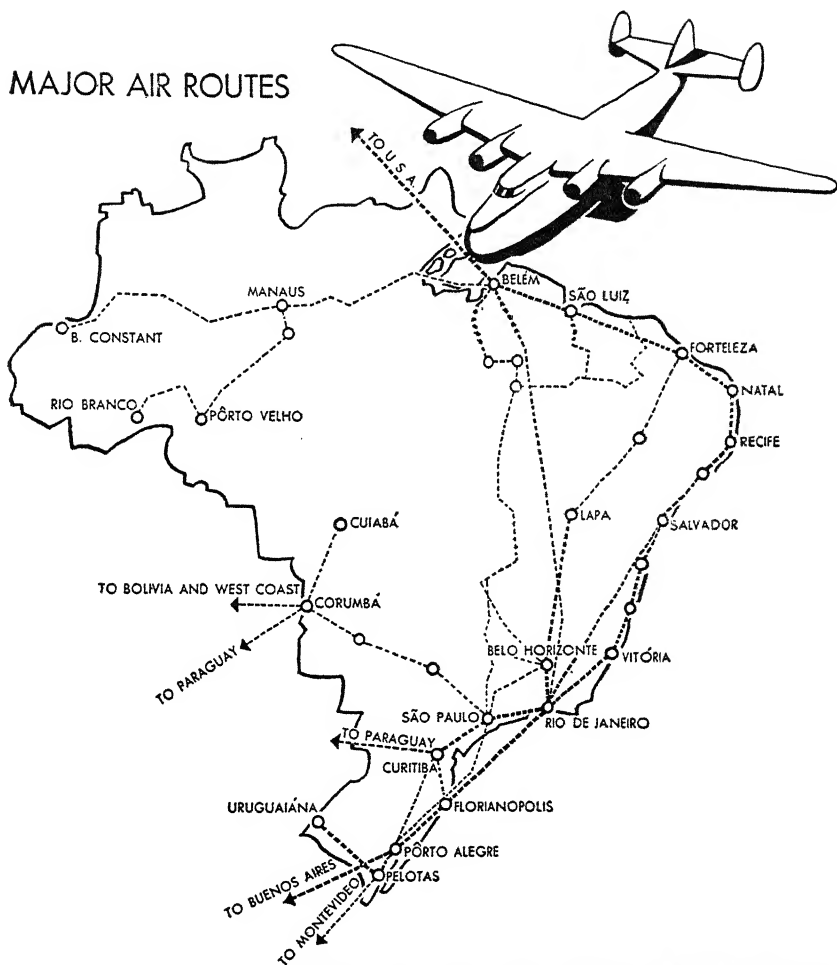


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Transportation is one of Brazil's greatest needs. The most of Brazil's railroad mileage is in the coffee country of the southeast. The Amazon is navigable almost to the foothills of the Andes.

tries. It is protected by a tariff high enough to keep out all cotton textiles except those of the finest quality.

In southern Brazil is the most valuable softwood area in all South America. The lumber milled from Paraná pine is widely used in Brazil and is exported to Argentina and Uruguay. We may therefore add lumbering to Brazil's important industries. Other smaller industries are the smelting of iron, the manufacture of tobacco, and the refining of sugar.



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Transportation. The Amazon River with its tributaries forms the greatest river system in the world. It is estimated that the rivers of the Amazon Basin furnish navigation in Brazil for river steamers for nearly 15,000 miles. In the southern part of the country the Paraná, Uruguay, and Paraguay Rivers, which combine to form the Plata River, drain an area as large as that drained by the Mississippi, Missouri, and Ohio Rivers in our own country and furnish water transportation in that section. The São Francisco is the waterway for the eastern plateau region. The forests along the Amazon and its tributaries contain untold wealth, but forestry has been little exploited because of the slow and uncertain river transportation and

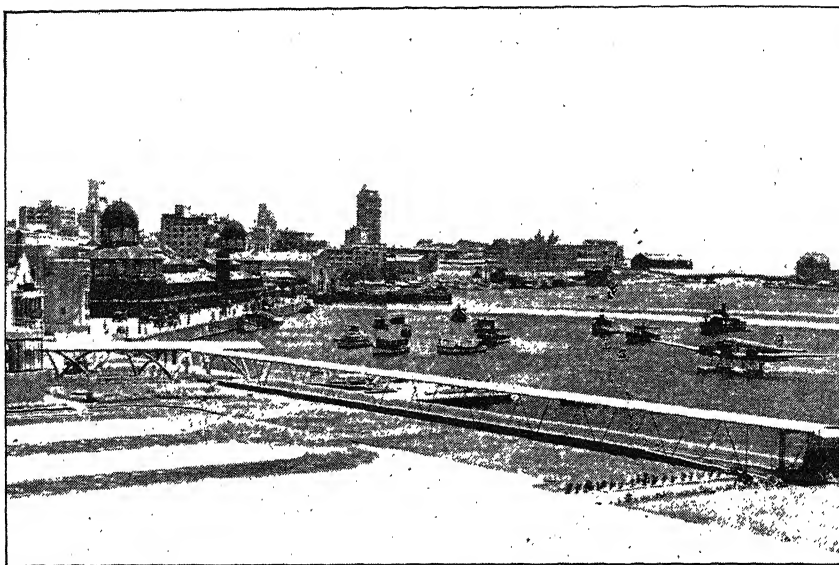


Photo by James Sawders

Terminal of the Pan-American Airways at Rio de Janeiro. The airplane is becoming the common means of travel between Brazil and the United States.

the lack of roads through the forests and jungles. A cleared road may be so overgrown with vines and underbrush in this hot moist climate that it practically disappears or becomes unusable in only a few days.

Brazil, however, has about 21,000 miles of railways, and plans have been made for greatly increasing the railroads when the necessary materials and equipment can be obtained. About one fourth of the present mileage is owned and operated by private interests. The rest is the property of the federal or of the state government. Short railroad lines extend inland from the various parts north of Rio de Janeiro. From Rio and São Paulo longer lines radiate into the interior. One can travel by rail from São Paulo to Montevideo, the capital of Uruguay.

In a country as large and as rich as Brazil with the limited transportation facilities that it has, the airplane is destined to play an ever-increasing role. In 1940 Brazil already was operating over 500 landing fields; almost 8000 commercial plane flights were made; over 70,000 passengers were carried; and the mileage flown was 4,337,300. The war has given a great impetus to the development of aviation. How great is of course a military secret. Coastal cities have provided new airports or improved their old ones. Landing fields have been hewn out of the Amazon jungle to facilitate the production of rubber

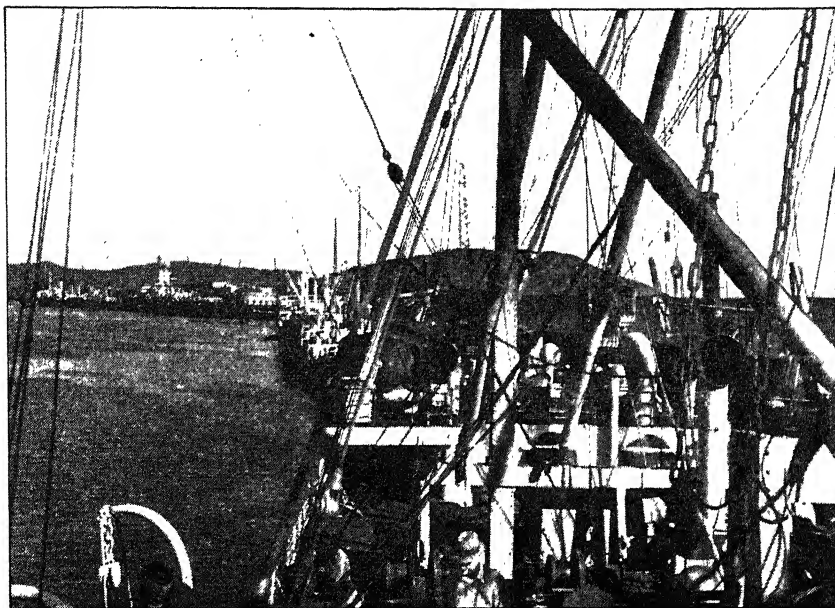


Photo by James Sawders

The harbor of Santos, Brazil. Steamers crowd the docks to load coffee at the world's leading coffee port. Most of the coffee shipped out comes to the United States.

which is so badly needed since Far-Eastern sources fell into the hands of the Japanese.

Trade with other lands. Brazil's exports have been the products of its plantations, forests, and mines. The leading exports in order of value have been coffee, cotton, animal products—including meats, hides, and skins—and cocoa. The only articles appearing in its list of exports which could be rated as manufactures are the products of meat-packing establishments, sugar refineries, and tobacco factories. The leading imports of the country have been foods, the most important of which are wheat and wheat flour coming chiefly from Argentina and the United States. Much of the wheat imported as well as that raised at home is milled in Rio de Janeiro, thus making that city an important milling center. In normal times machinery, automobiles, and trucks stand high on the list of imports. These products come largely from the United States. Brazil has no petroleum of its own; therefore petroleum and its products constitute important imports. These products too are chiefly from the United States.

Brazil's leading ports. *Rio de Janeiro* is the capital and largest city of the country. It is noted for its picturesque harbor and for the beauty of its parks and public buildings. *Santos*, the chief city of

the state of São Paulo, is the leading coffee port of the world. *São Salvador* (Bahía) to the north is the center of the cocoa and tobacco industries. *Recife* (Pernambuco) exports cotton and sugar, and *Belem* (Pará) was for years the world's leading rubber port. In later years it gave way to Singapore of the Malay Peninsula. Besides some rubber Belem exports Brazil nuts and lumber.

5. PARAGUAY—AN INLAND COUNTRY

The beginnings of Paraguay date from a settlement made at Asunción in 1535 by the Spanish. Originally Paraguay was a dependency of Peru, as were Bolivia and Argentina. The city of Asunción was established at a natural harbor of the broad and deep Paraguay River so that the Spanish might have an outlet to the Atlantic Ocean by way of the Paraguay and Paraná Rivers for the gold and silver and other products produced in Peru. The city has remained the chief river port and trading center of the country. It is 970 miles by river almost due north of Buenos Aires with which it has also had railroad connection since 1913.

A fighting people. Independence from Spain was accomplished by a bloodless revolution in 1811. For 60 years there was little intercourse between Paraguay and the surrounding countries because of the policy of its despotic rulers, the last of whom plunged Paraguay into a disastrous war, that lasted for years, against Brazil, Argentina, and Uruguay. When defeat came, the country was desolate and practically no male population survived. Out of a population of more than a million only about 200,000 remained. The period following 1870 has been interrupted by civil wars. The area between the Pilcomayo River and the Paraguay River, part of the Gran Chaco, has been claimed by both Bolivia and Paraguay and has frequently led to the bloodshed of both claimants. The ever-recurring dispute was settled on October 10, 1938, by the award of 91,800 square miles of territory to Paraguay—increasing its area to about 175,000 square miles.

A backward country. Paraguay is a country of little commercial importance. Its population is ninety per cent Indian and mestizo. There are said to be more than 60 colonies of foreign peoples settled in the Republic. They are mainly engaged in stock-raising and farming. These colonies maintain their native characteristics and have their own schools, churches, hospitals, and mercantile establishments. One of the largest of these is a colony of about 6000 Men-



Photo by James Saunders

A plantation of yerba maté trees. Yerba maté is now served in the United States in some hotels and occasionally in Pullman dining cars.

nonites, most of whom emigrated from Canada. Paraguay's inland location tends to hinder world contacts and to make the country more backward. Its communications and trade are almost wholly with bordering countries by way of the Paraguay River and its tributaries and the Paraná River. Next to agriculture the leading occupation is cattle raising and the chief exports are animal products, such as hides and skins, beef extracts, and canned beef. Next in order of value stand the forest products. Quebracho extract and quebracho logs used for tanning leather are products of Paraguay, especially of the Chaco region.

Agricultural and mineral products. Yerba maté, or Paraguay tea, is of considerable commercial importance in southern South America. The small tree producing it grows wild and to some extent is cultivated in Paraguay and southern Brazil. Both these countries export the tea to Argentina and Uruguay. The tea is cured by passing the branches quickly through the flame of a hot fire. It is said to have no harmful effects, and it enables those who drink it to do hard work with less fatigue. Its sale and use are limited almost wholly to countries bordering the areas of production. Argentina is the chief importing country.

Paraguay is self-sufficient in food products with the exception of wheat and flour which are imported from Argentina. Plentiful supplies of corn, manioc, sugar cane, coffee, rice, beans, and tropical fruits are raised. Tobacco and cotton are also important crops.

Minerals—iron ore, manganese, copper, and others—are known to be abundant but are yet unexploited, largely because of lack of fuel for smelting and poor transportation facilities.

GUIDES TO STUDY

1. How does the climate of the Amazon valley differ from that of the Mississippi valley? Why?
2. The Amazon valley is rich in resources. Which of these resources are most likely to be developed in the future? Why?
3. Describe the introduction of coffee into Brazil.
4. Why does Brazil lead the world in the production of coffee?
5. How is coffee raised and prepared for market?
6. The output of Brazilian cotton is increasing rapidly. Give reasons for this increase.
7. Why is Brazil unable to raise cattle as successfully as Argentina? What part of the country is best adapted to cattle raising? Why?
8. What use will probably be made of Brazil's deposits of iron ore in future years?
9. What conditions in Brazil favor the development of manufacturing? Which of the country's products could best be used as raw material in its own factories?
10. What are some of Brazil's transportation problems?
11. Why is aviation in Brazil likely to become increasingly important?

TOPICS FOR CLASS DISCUSSION

1. Brazil's fifth columnists.
2. Overproduction of coffee.
3. Brazil's cotton belt.
4. Natal as an aviation center.
5. The seaports and riverports of Brazil.
6. The resources of Paraguay.

WORK TO BE DONE

1. Compare the areas and populations of the United States and Brazil. Account for the difference in the populations of the two countries.
2. Assign as a special report: The Ford rubber plantations in the Amazon valley.
3. On an outline map of Brazil show the locations of the chief cities and the railroad lines. Why is the railway mileage of the country so small? For what is each city important?
4. On the same outline map indicate the principal areas devoted to the raising of coffee, cocoa, tobacco, and cotton and to cattle raising.
5. Find out all you can about the carnauba palm and report to the class.



Pictograph Corporation for the Coördinator of Inter-American Affairs

Compare the agricultural products of Argentina with those of Brazil. Account for the differences. Which of Argentina's products are exported to the United States? Give the reason why each exported product is needed in this country.

6. ARGENTINA AND URUGUAY—PEACETIME TRADERS
WITH INDUSTRIAL EUROPE

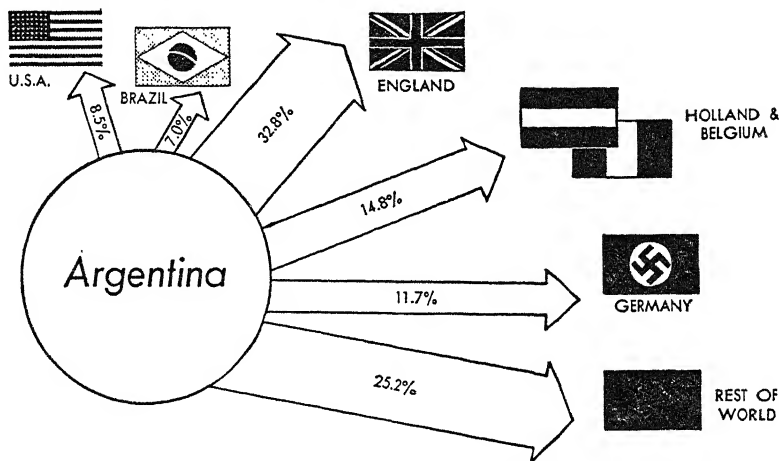
ARGENTINA

Argentina, the second largest country of South America, extends from Bolivia 2300 miles to Cape Horn and from the ridge of the Andes Mountains to the South Atlantic Ocean. It comprises the greater part of southern South America. Its greatest breadth is less than 950 miles. The region of the Plata River was first visited by white men in 1515 when Juan de Solis ascended the river in hopes of finding a passage to the East Indies. Eleven years later Sebastian Cabot in command of a Spanish expedition named the Plata River and settled a colony on its banks which Spain claimed and made a dependency of Peru. Two and a half centuries later the La Plata colony was granted a degree of home rule but not enough to satisfy the colonists who revolted from Spain, declaring their independence in 1816. Disorders and civil wars followed until 1853 when a constitution was adopted and the first president of the Argentine Republic was elected. Argentina has had bitter border disputes over many years. It is, however, much to the credit of the Argentines that all of these questions of boundaries have been settled for good by arbitration and not by recourse to war. The last border dispute was with Chile. It was ended in 1902 and its consummation was marked by the erection of a monument, "Christ of the Andes," at the summit of Upsallata Pass. It bears the inscription "Sooner shall these mountains crumble into dust than Argentines and Chileans break the peace sworn at the feet of Christ the Redeemer."

Once the market basket of Europe. Our Middle West with its hundreds of miles of waving wheat and corn has been called justly the *breadbasket* of the United States. The packed cities of industrial Europe have looked to Argentina for food supplies—for wheat, beef, and mutton in enormous quantities. From the ranch and the farm came the products that lifted Argentina to its high place in world commerce. It surpassed all other nations in exporting beef and corn; it occupied second place (sometimes third) as an exporter of wheat; it stood second as an exporter of mutton. No wonder Argentina was called the *market basket* of Europe.

With some of the money resulting from this successful trade, Argentina turned to the United States to supply itself with modern farm equipment. It bought tractors, reapers, and other farm ma-

ARGENTINA'S PRE-WAR EXPORTS (1938)



Pictograph Corporation for the Coördinator of Inter-American Affairs

Why did Argentina send a much larger part of its exports to European countries than to the United States?

chines, as well as automobiles. Thus the Argentine farmer kept not only European factories busy and European workers employed and fed, but American farmers and factories as well. Truly a great trade cycle had its mainspring here in South America.

Progressive people. No other country of South America has so large a proportion of white people of pure European stock. The climate and the many resources have favored the settlement of the country by progressive peoples. While the majority of the inhabitants are of Spanish origin and Spanish is the language of the country, there are a large number of Italians and many Germans among the population. There are practically no mixed races here as in other parts of South America. The reason for this is partly due to the fact that the original inhabitants were very warlike, preferring death to submission and were therefore exterminated. The picturesque Argentine herdsmen and shepherds are descendants of the Spanish and the Indians.

Four regions of Argentina. The Andes Mountains form the western boundary of Argentina. The rest of the country to the east is generally level. There are four distinct natural regions: the Gran Chaco, the pampas, Patagonia, and a desert belt that parallels the Andes Mountains. The differences in the crops and the occupations of these four regions are due to the variations of climate, especially rainfall.

The *Gran Chaco* is a name applied to a section of South America, part of which is included in Argentina. The Argentine Gran Chaco lies in the northern part of the republic. It has a warm, moist climate and is covered with open forests of quebracho and other trees. The quebracho is very valuable because its bark, sapwood, and especially its heartwood are rich in tannic acid. The quebracho requires a semitropical climate and an abundant rainfall.

South of the Gran Chaco lie the *pampas*. Level, fertile, usually well-supplied with rain, the pampas constitute "one of the garden spots of the earth." The soil has been washed down from the mountains and not a stone can be found for hundreds of miles. Here is where the great crops of wheat, corn, and flaxseed are raised; here also is a vast natural pasture where innumerable cattle graze. The climate is so mild that no barns or sheds are needed to house the cattle. All the year round they can remain in the open fields. No wonder that wealth has come to the owners of the enormous ranches as a result of the exportation of meat and meat products!

Patagonia, lying south of the pampas, is the least productive part of Argentina. The rainfall is light because the Andes cause the westerly winds to lose their moisture. The winters are unpleasant always and in the south exceedingly cold. This is no place for crops; bunch grass and scrub cover the land which is suitable only for sheep raising.

The fourth region of Argentina is the *desert belt* that lies east of the Andes and west of the Gran Chaco and the pampas. This is practically a rainless country. The section is too far from the Atlantic to benefit from the moisture carried by the southeast trade winds; the lofty Andes cut off the winds from the Pacific. Irrigation is the only hope of this region. Water is brought from rivers of the Andes and, in areas thus irrigated, some agriculture can be carried on. The provinces of Tucumán, San Juan, and Mendoza are the most important of the irrigated regions.

To sum up, Argentina's great advantages are its temperate climate, its level surface, and its soils suitable for grazing and agriculture on an extensive scale. Its areas of greatest production are near the sea; so there are no expensive hauls for grains, meats, hides, or wool when being shipped to foreign countries.

A network of railroads. The level country east of the Andes is an ideal surface for railroad construction (Pl. 5). The railroads are largely limited to the region within a few hundred miles of Buenos Aires. Here lie the great areas of wheat, corn, and flaxseed; here



Photo by Julien Bryan from James Sawders

A flock of sheep on the Argentine pampas. Note the vast extent of level land and the highway fenced off from the grazing lands. Wool, hides, and mutton have been among Argentina's leading exports.

are the extensive ranches with their millions of cattle, sheep, and goats. The vital center of all this wealth is Buenos Aires, the capital.

There are over 25,000 miles of railroads in Argentina, mostly owned and operated by British investors. The terminal stations in the capital are large and impressive. Buenos Aires is connected with Valparaíso, Chile, on the Pacific Ocean by a railroad through Mendoza.

Development of aviation. Aviation has been developed rapidly in the republic, chiefly by foreign companies. Before the war there were two weekly transoceanic air-mail services between Buenos Aires and Europe. There was a consistent growth shown in the number of passengers carried as well as in the amount of mail and express transported. The commercial air lines of South America follow the coast lines, and Buenos Aires is connected with all the important capitals and many of the larger seaports. It is also connected by airplane with the air routes of North America and the Old World. One air route from Buenos Aires via Cordoba crosses the Andes to Santiago, Chile. When peace comes, a rapid development of airplane transportation in Argentina can be expected.

A great granary. Wheat, corn, and flaxseed are the chief crops and have been largely exported. As we have learned, the best farm-

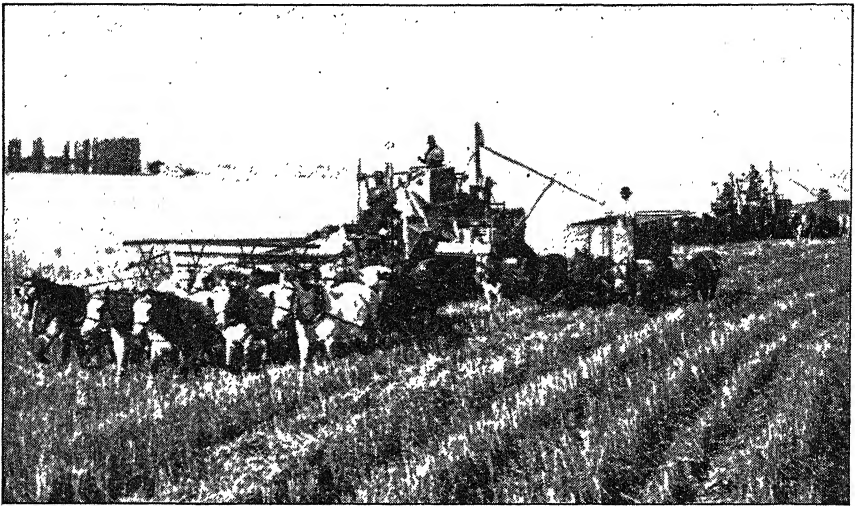


Photo from Monkmeyer Photo Service

Harvesting wheat on the pampas of Argentina. Most of Argentina's farm machinery is imported from the United States.

ing lands are on the pampas, within three hundred miles of the ports of Buenos Aires and Rosario. Here the moderate temperatures are better for grains than the more tropical regions to the north. Here too the rainfall is heavier than it is in the west or the south. As in our own country, the ranches cover thousands of acres. Planting, cultivating, reaping, and threshing are done by means of modern agricultural machines imported from the United States.

After being threshed, the grain is poured into bags. Great numbers of these bags are stacked out of doors and are protected from the weather only by a cover of canvas. Later the sacks are loaded on enormous carts for transfer to the railroad stations. As there is no stone on the pampas for road building, the roads are of soft dirt. Consequently the carts have great wheels, eight and ten feet in diameter. The grain elevators at the ports cannot shelter all the grain; therefore, much must be left in the open until there is an opportunity for shipment.

Of all the cereals wheat has held first place in the export trade of the world. Before World War II Argentina was one of the leading countries in the production and exportation of this cereal, devoting about 19,000,000 acres to its production. It exported more than half of all the wheat raised. Much of the wheat was exported in the form of flour. Brazil and Great Britain have been heavy buyers.

About one fourth of the farm land of Argentina is given over to



Photo from Monkmeyer Photo Service

Cattle pastured on the pampas of Argentina. In peacetimes western Europe looks to Argentina for much of its supply of beef. Some of the hides are exported to the United States.

corn, and the entire yield is much less than that of the United States. Yet Argentina has exported more than three quarters of its crop while we exported not more than two per cent. This striking contrast is due to a marked difference in the feeding of domestic animals. The United States uses more than half its corn in fattening cattle and hogs. Argentina, having few hogs in comparison and using alfalfa for cattle feed, can export most of this valuable grain.

Flaxseed, like wheat and corn, is raised on the pampas. As a crop, it takes much from the fertility of the soil, but it is little harmed by drought or sultry weather. As you have already learned, Argentina has been the greatest exporter of flaxseed, nearly one fourth of which came to the United States. Among the exports of Argentina, flaxseed has been third in value. Other important crops are cotton, sugar, and grapes.

Alfalfa. Alfalfa is a kind of clover with very long roots, which enable it to resist drought and to thrive even in arid regions where most grasses would die. Vast areas of wastelands have been made useful by this astonishing fodder plant. In the mild climate of the pampas alfalfa supplies the cattle with food all the year round. Use of this crop is the basis of the successful cattle industry of today. It has been said that this crop has brought to Argentina wealth far surpassing the gold taken by the Spaniards from the Andes in the early days of the exploration of the continent.

Blooded livestock. The early Spanish settlers brought cattle

from the Old World to the New. These animals ran wild over the pampas and were hunted chiefly for their hides. With the advent of the refrigerator car and ship there came a greatly altered attitude toward the cattle industry. Europe was calling for fresh beef and better beef. To meet this demand, blooded cattle—English Short-horns and Herefords—were imported. The old stock was constantly improved so that today the Argentine beef cattle are among the best in the world. Animals for breeding have sold as high as \$60,000 each. It costs no more to feed a high-grade animal than a thin, bony one. When the ranch owner receives twice as much for the superior animal as for the inferior, every effort is redoubled to improve both quantity and quality in the individual beast. India, the United States, and Russia are the only countries with more cattle than Argentina.

Argentina regularly exported five times as much beef and beef products as the next-largest exporting country. Fresh beef went almost entirely to Europe; to the United States it sent large quantities of canned beef.

✓ Lend-lease helps Argentina. Since Argentina's foreign markets for its ranch products have practically been cut off by the sinkings by submarines in the Atlantic, the country would be in a bad way if it were not for the convoy system and our lend-lease aid. The formerly busy harbor of Buenos Aires is quiet except on the days when a British convoy arrives to pick up entire shiploads of meat, which are loaded from British, Argentine, and United States' packing plants by shifts of loaders working day and night. Our government pays Argentina for the meat under its lend-lease deal with Great Britain. Parts of the shipments are also feeding our troops in Europe and in Africa. Another indication of the change in the activity of Buenos Aires' port is that, where formerly 2,000,000 tons of coal arrived from England each year for use in locomotives and in the factories of coalless Argentina, scarcely 200,000 tons arrive now. Locomotive tenders are filled with Argentine yellow corn instead which is being burned for fuel.

Argentina out of step. Argentina is the only one of the South American Republics that has not either broken off diplomatic relations with or declared war on the Axis Powers. While it is true that the mass of the Argentines—probably as many as ninety out of every hundred, even including a large population of Italian parentage—is not pro-Axis, the Argentine government first under Castillo and now under Farrell is still isolationist and refuses to join the other republics in their attitude toward the Axis Powers. Before World

War II Argentina looked to Europe for purchasers for its cereals, meats, hides, and wool. Great Britain and Germany were two of its best customers. In many ways the United States was considered a competitor because both countries produced the same crops, and the United States was self-sufficient in the products that Argentina had for export. Naturally, the government of Argentina expects the same conditions to be in effect after the war is over and hopes again to have its important European markets reopened for its surpluses. As a result of the war Argentina is still able to sell enormous quantities of its chief products to the British Food Mission with offices in Buenos Aires. As stated before, these supplies are for the benefit of the United Nations and are paid for out of lend-lease funds of the United States. The result of the magnitude of these purchases has been that Argentina has been able to get much higher prices for the same products when bought by other South American countries.

So, notwithstanding the loss of former foreign markets and an abnormal change in shipping activity, Argentina has probably felt the impact of war less than any other country in North or South America. The population is unrationed in food and clothing, automobile owners have no ration cards for gasoline, and few able-bodied men are out of work.

While the Argentines have no doubt profited by the war they have lost in prestige. Its attitude has become increasingly unpopular in the other countries of South America, and Argentina is faced with the loss of its traditional position as the political and economic leader of the continent.

There is growing concern among far-seeing statesmen as to what will happen when the tide of war has definitely turned against the Axis and the country's accumulation of raw materials begins to be exhausted. Will a helping hand be extended by Britain and the United States to Argentina which had done nothing until the end was plainly in sight?

Argentine statesmen are also worried over the industrial and technical aid that is being given by the United States to Brazil, their neighbor to the north. They fear the growing strength of Brazilian military and air power, as well as the industrial development that has already begun to come from the coöperation of the United States, the giant of the north, with Brazil, the giant of the South.

Trends in dairying. In the early part of the present century there was a great advance made in the scientific handling of milk, butter, and cheese. Large well-equipped factories were located near

Buenos Aires and other large cities where consumption of dairy products is greatest.

Argentina has exported about one quarter of the butter produced. Great Britain has been the country's best customer. Another dairy product of growing importance is *casein*. This substance is a product of skim milk used to make certain kinds of paint, waterproof glues, plastics, face creams, buttons, combs, and imitation ivory, to coat paper, and in printing wallpaper and fabrics. By a newly invented process casein is being used in making a substitute for wool. Sweaters and other articles of clothing are made of this material. Argentina has supplied three fourths of the world's output of casein, and we have imported in the past about one seventh of Argentina's production.

Sheep raising. Argentina stands fourth among the sheep-raising countries of the world—Australia, Russia, and the United States surpassing it. The number of sheep in Argentina has shown some decline in past years, but a recent livestock census indicated that there were about 44,000,000 sheep in the country. Does this drop spell misfortune? The fact is that, thanks to alfalfa, more and more barren lands have been reclaimed. Green pastures for cattle and rich farms have displaced the sterile ground where once only sheep could find a living. More and more the flocks have been forced into the poorer lands where crops and cattle raising are not profitable. In central Argentina, where sheep are raised more largely for lamb and mutton, there are large meat-packing plants convenient to the chief ports.

Wool, mutton, and lamb have been leading exports. Argentina has been surpassed only by Australia in the quantity of wool exported and by New Zealand in the quantity of mutton and lamb. The United States has imported little or no mutton, but, of late years, more and more wool has been imported as well as cattle hides and sheepskins. Much Argentine wool has gone to European countries.

What irrigation has accomplished. The dry lands of the west have been made fertile by irrigation. Water from the mountain streams of the Andes has been diverted into a network of innumerable canals and ditches. Sometimes the government has aided in these important undertakings, for the expense is very great. The fine city of Mendoza lies in the largest section of irrigated land. Here is the center of the important wine industry. Many of the vineyards are owned by Frenchmen and Italians, skilled in the culture of the grape through their Old World experiences. Often years are re-

quired before a wine reaches perfection; so large cellars are built in which casks, barrels, and bottles may be stored indefinitely.

Other products of the irrigated lands are sugar and fruits. Sugar comes from the sugar cane, which is grown chiefly in the province of Tucumán. Argentina produces all the sugar needed for home use, but exportation has been handicapped by the distance of the sugar fields from the ports. The fruit industry has a promising future. Because of the difference in seasons the fruits of Argentina ripen in our springtime, long before our fresh fruits come to market. So, both in the United States and in Europe, Argentine fruit has found a ready market at good prices.

The quebracho tree. The forests of Argentina are in such inaccessible regions that, for building purposes, it has been easier to import lumber from the United States. They do, however, contribute one highly valuable tree—the quebracho. Argentina and Paraguay are the only places in the world where this useful tree is found. Its heartwood is cut into chips and steeped in hot water, which removes the tannin (p. 246). The result of the process is a dark-colored substance which is put into jute bags for shipment. Many quebracho logs have been exported too. About one fourth of the extract and logs exported in the past have come to the United States.

Manufacturing—a minor activity. Industrially Argentina is seriously handicapped in that it lacks fuel, power, and minerals. Being chiefly an agricultural country, the manufacturing prior to World War I had been mainly the preparation of raw materials from farm, ranch, vineyard, and forest for home needs and for the overseas trade. Since that time it has been rapidly expanding. There are today over 50,000 manufacturing establishments, some of which employ more than 1000 workers. Most of the important manufacturing is done in or near Buenos Aires, Rosario, and Bahía Blanca. Here are large plants for meat packing and flour milling, the tanning and working of leather, and the weaving of textiles. Northern Argentina supplies all the cotton needed for its own mills and can provide a surplus for export. The processes in these mills are comparatively simple, and the workers are not highly skilled. Goods requiring intricate machinery and expert workers must be imported. No doubt it will be long before Argentina can compete industrially with Europe or the United States.

A leader in South American trade. With its great fields of cereals and its countless sheep and cattle Argentina is well able to

EXPORTS



CEREALS



LINSEED



MEAT



WOOL & HIDES



OTHER PRODUCTS

IMPORTS

MACHINERY &
STEEL PRODUCTS

TEXTILES



FUELS

OTHER
PRODUCTS

Each symbol represents 10% of value of all imports (or exports)

Pictograph Corporation for the Coördinator of Inter-American Affairs

These charts show Argentina's exports and imports in peacetime. What do these charts tell of the country's leading industries?

feed Europe. It has surpluses of wheat and flour, flaxseed, corn, meat, wool, cattle hides, and sheepskins—all products of the farm or ranch. Only India surpasses Argentina in the value of the hides and skins that can be exported.

In Europe Great Britain has been Argentina's leading customer. Britain's need for foods and raw materials is very great. The chief products of Argentina that can be used by the United States are linseed, hides and skins, quebracho, wool, and canned meats. To its

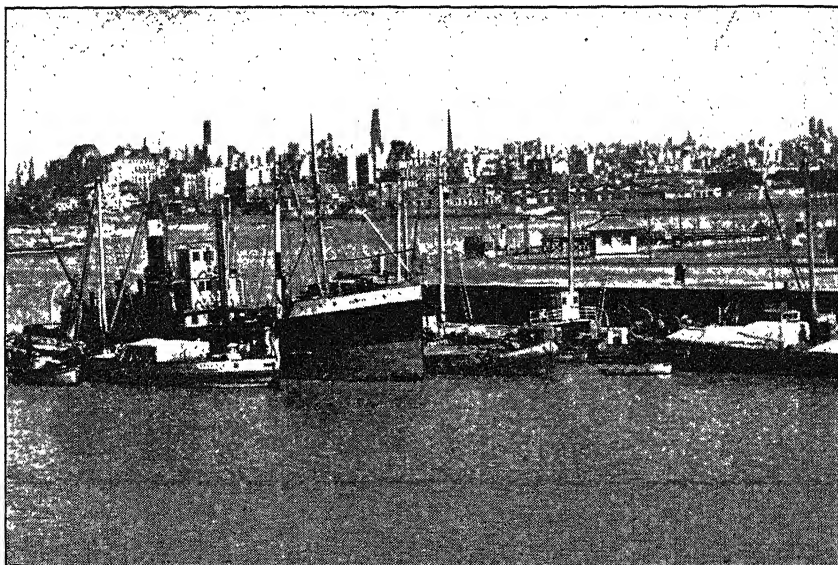


Photo by James Sawders

Part of the water front of Buenos Aires. The wealth of the city is drawn largely from the raising of grain, cattle, and sheep on the pampas.

near neighbor, Brazil, Argentina sells much wheat. Its foreign trade has been twice that of Brazil, its closest rival in South America.

The products needed by Argentina are chiefly manufactured goods from Europe, especially Great Britain, and from the United States. Great Britain and the United States have supplied more than a third of all Argentina's imports. Ninety per cent of the automobiles and a large proportion of all the farm machines imported have come from our country. We also have sent petroleum products, lumber, and radio and telephone apparatus. One item of interest on Argentina's import list is jute, large quantities of which have been imported to be made into bags for grain, wool, meats, quebracho, and other products.

Three chief ports. The leading ports of Argentina are Buenos Aires, Rosario, and Bahía Blanca. *Buenos Aires* is the largest city in the southern hemisphere. This port attracts products of all kinds from every section of the country. Here are the factories and the great docks from which have been shipped grain, meats, wool, and other products of farm and forest. It is an amazing blend of Chicago, New York, and Washington. Like Chicago it is a great railroad center surrounded by an agricultural and grazing region; like New York it is a great seaport through which must pass most of the Argentine trade; and like Washington it is the capital of the republic.

Apparatus of all sorts, elevators, warehouses, and railroad lines combine to handle both swiftly and efficiently the products pouring into this great city, a very large part of which in normal times enter into Argentina's foreign trade.

Rosario is the second port of Argentina. It is situated on the western bank of the Paraná River, where there is a good harbor. It is 188 miles from Buenos Aires by railway and 244 miles by river. It has been an important port for handling grain and flour. Its docks are excellent; as many as forty ships may be loaded at one time.

Bahía Blanca is the most important city of southeastern Argentina. Situated on an excellent harbor, it is near the greatest grain and grazing section of Argentina. It is nearer the Atlantic Ocean than Buenos Aires or Rosario and has rail connections with both of these cities. In commercial importance Bahía Blanca ranks higher than some of the larger cities of the republic.

URUGUAY

A prosperous nation. Uruguay is the smallest of all the South American republics. Nevertheless, it is wealthy and very progressive as is shown by its advanced social-service legislation, which provides for old-age pensions, child welfare, State care of mothers, free medical service for the poor, workmen's accident insurance, cheap dwellings for laborers, an eight-hour day and a six-day week, a minimum wage, and special consideration for working women and minors. Workmen have the right to strike and to form unions. The country's prosperity is the result of two factors—the character of the people and the nature of the country. As in Argentina, the people are mainly of European stock. The native Indians were exterminated by the early settlers; so there were few marriages between the red race and the white. The country consists almost entirely of rolling plains which are covered with grass and are ideal for the raising of cattle and sheep. The climate is so mild that the herds and flocks can remain in the open all the year round. The Uruguayan finds little attraction in farming; he prefers long days in the saddle, guiding and tending his wandering herds.

A ranchman's paradise. Before the invention of refrigerator cars and ships the cattle ran wild over the plains and were hunted for their hides and their tallow. The flesh was used to make extracts of beef, and a few large factories were built for this purpose. The carcasses of sheep were regarded almost as a waste product. The



Photo by James Savaders

Stockyard and modern freezing and packing plant of Swift and Company at Montevideo, Uruguay. American packers established packing plants in South America when the packing plants of the United States no longer supplied enough beef for our own use and for export to Europe.

animals were driven to brickkilns, where they were killed, the skins removed, and the carcasses fed to the flames as fuel for the kilns.

Some years ago all this was changed. The frozen or chilled beef or mutton could be sent in refrigerator ships to the crowded industrial centers of Europe. American and British investors saw a great opportunity here. They promptly established large meat-packing plants in Montevideo, the capital and chief port of Uruguay.

Minor industries. The government has attempted to encourage cultivation of the soil and thus secure for the country a greater variety of products. This has been uphill work, however, for the freer life of the ranchman is preferred to the more plodding toil of the farmer. Some farming is carried on, the chief crops being wheat, corn, oats, flaxseed, tobacco, and olives. Wine making is an important industry. There is some tanning of leather and manufacturing of woolen and leather goods. These, after all, are but minor industries; the major industry being meat packing.

Imports and exports. Before World War II Uruguay's leading imports were gasoline and fuel oil, sugar, coal, and textiles. The country is without coal or petroleum; its forests are small, consisting



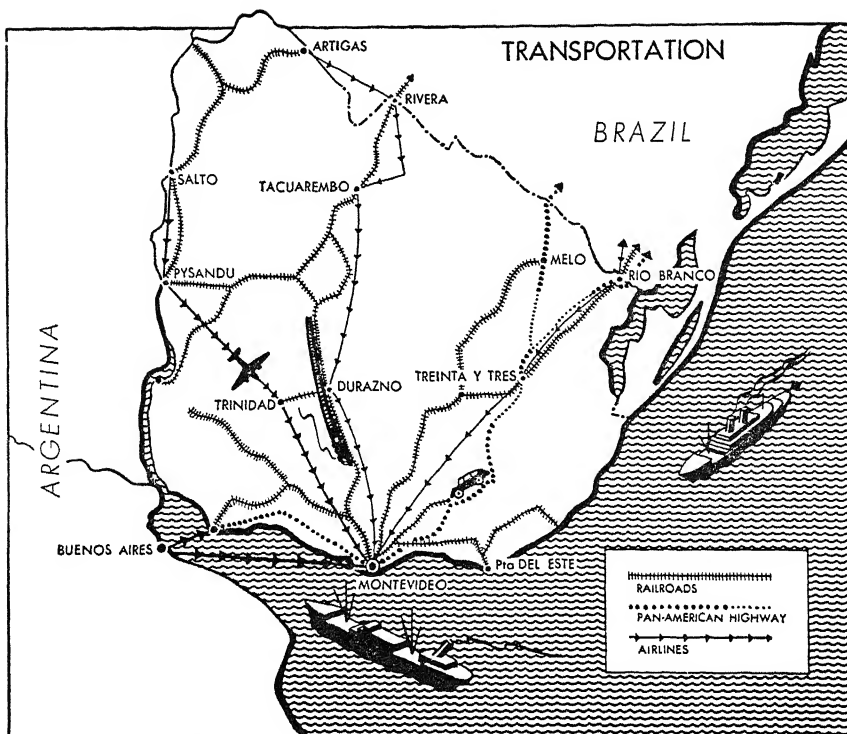
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Uruguay's leading occupation is the raising of cattle and sheep. List the exports resulting from this occupation.

of the trees edging the banks of some of the streams. Fuel for the homes and the factories must be brought from abroad.

As we should expect, nearly eighty per cent of the exports were products of the ranches. The United States had a large trade with Uruguay. It sent us wool, hides, fertilizer materials, and flaxseed; we sent in return petroleum products, automobiles, and sugar. Our trade with Uruguay was exceeded only by that of Great Britain.

Uruguay's brave stand. Unfortunately Uruguay, one of the first Latin-American countries to rally to the side of the democracies, has so far suffered much more serious economic effects from its course than has its isolationist neighbor Argentina. The capital, Montevideo, where about one third of the population of the country lives, is short of both coal and gasoline because, unlike the Argentine



Pictograph Corporation for the Coördinator of Inter-American Affairs
The transportation systems of Uruguay

Republic, it produces no gasoline at home; and almost no oil tankers have been available to bring petroleum products either from the United States or from Venezuela which formerly supplied the country. Therefore, gasoline has been rationed to about 40 per cent of normal. Like Argentina, Uruguay has been forced to use corn for fuel in place of coal, but supplies of corn have been so reduced as to make other substitutes necessary. Wood and sunflower seeds are being shipped down the Uruguay River to supply much-needed fuel.

Uruguay likewise has had to interrupt its building and construction program from inability to secure steel reinforcing rods because of war needs of steel and difficulties of shipping.

The country has benefited, but less than Argentina, from huge sales of meats and meat products to the British Food Mission, and it has developed among other products a specialty—canned stewed beef for army and civilian use.

In the past we have bought much wool from Uruguay. Here again shipping difficulties are a handicap. We have been taking large

quantities of this fiber, so necessary for army and civilian clothes, from Australia in order to utilize supply ships returning from the Pacific front, which otherwise might have to return empty or only partly laden. It would be advantageous to the United States and in line with our good-neighbor policy to purchase Uruguay's wool clip even if it had to be stored till after the war.

Uruguay is suffering in another way. Its third biggest industry has been as a vacation land. Its long sandy Atlantic beach and its fine resort hotels have been attractive to visitors with leisure and money when Buenos Aires and the cities situated along the Paraná and Uruguay Rivers were sweltering in the humid heat. At least two factors will greatly cut Uruguay's revenue from tourists—one, the current shortage of gasoline, the other, the close scrutiny which all travelers must undergo, as part of a plan to prevent the flow of information from belligerent Brazil by agents of the Axis to their embassies in the Argentine. It is greatly to Uruguay's credit that it has taken the brave stand it has, with consequent material losses, in the face of Argentina's seeming prosperity.

GUIDES TO STUDY

1. How is Argentina's progress related to the climate and resources of the country? To the character of the people?
2. Why is Argentina out of step with the rest of South America?
3. Tell of the discovery and settlement of Argentina.
4. Why was Argentina's trade with European countries greater than that with the United States?
5. How do the resources of Argentina differ from those of Brazil? Why?
6. Why is Argentina an excellent country for raising wheat, corn, and cattle?
7. Why can the products of Argentina reach European markets as cheaply as the products of the United States?
8. What steps have the livestock raisers taken to produce more and better beef?
9. How has the use of animal products changed from earliest times to the present? Why?
10. What products of Argentina have gone mainly to European countries? What products have been sent both to European countries and to the United States? Explain.
11. In what respects are Argentina and the United States competitors in the world's markets?
12. Among Argentina's usual exports are corn, wheat, meats, hides and skins, cane sugar, raw cotton, grapes, and quebracho. What do these exports tell of the climate of different parts of the country, of its resources, and of its leading occupations?
13. Argentina's leading imports are textiles, manufactures of iron and steel,

automobiles and tractors, farm machinery, and the products of petroleum. What do these imports tell of the country's resources and occupations?

14. Why is the raising of cattle and sheep the leading occupation of Uruguay?
15. How has the present war affected Uruguay's industries and its relations with other countries?

TOPICS FOR CLASS DISCUSSION.

1. Aviation in Argentina.
2. Products of the desert.
3. Buenos Aires, center of the country's wealth.
4. How lend-lease helps Argentina indirectly.
5. Argentina's relations with the Axis Powers and with the United Nations.
6. Uruguay's chief source of wealth.
7. Uruguay's stand in World War II.

WORK TO BE DONE

1. On an outline map of Argentina and Uruguay locate the regions noted for the chief products of each country. Print names of leading cities and learn for what each is important.
2. The value of Argentina's exports ordinarily is much greater than the value of its imports. Does this same condition exist in other South American countries?
3. Many of Argentina's railroads were built by British capitalists. Many of its products are carried in British ships. How are these services paid for? How is this condition related to the relative value of exports and imports? (See Great Britain's carrying trade and foreign investments, p. 533.)
4. What is meant by the ABC countries? Why have these countries great influence in South American affairs?
5. Argentina exports normally more corn than the United States; yet it produces very much less. Explain. Does the use of alfalfa make a difference?
6. Buenos Aires is known as the "Paris of South America." What does that mean, and what makes it possible?
7. Make a study of the history of the cattle and sheep industry in Argentina and Uruguay.

7. ANDEAN SOUTH AMERICA—SOURCE OF STRATEGIC RAW MATERIALS

CHILE

The Araucanians, the native Indian inhabitants of Chile, were a brave and intelligent people. From about 1540 for two centuries they struggled against the Spanish invaders. About 20,000 Araucanians still live in practical independence in Chile. The Chilean colonists tired of Spanish domination, threw off the Spanish yoke and achieved their independence in 1818. Jose de San Martín and

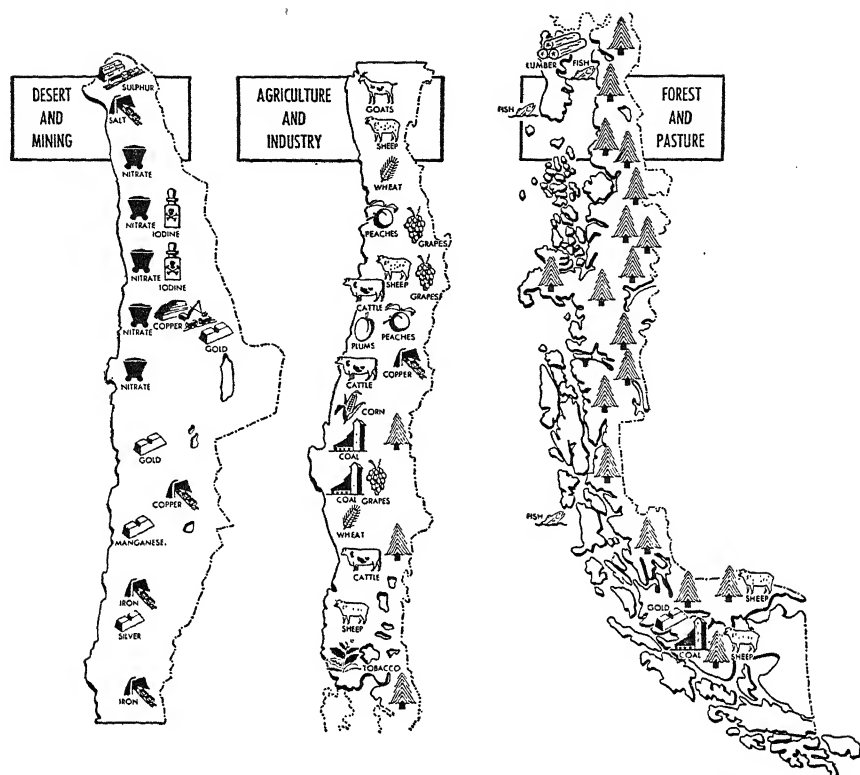
Bernardo O'Higgins were the leaders in this struggle for liberation from Spanish misrule. The early history of Chile seems to have been less marred by domestic troubles and uprisings than has usually marked that of other South American states. However, Chile had its fair share of disagreements with neighboring countries. Relations over the Argentinean-Chilean boundary were strained for 60 years. Often it seemed that war was inevitable, but peace was finally achieved marked by the statue "Christ of the Andes" (p. 476). About the time our War between the States ended, Peru and Chile were forced into a war with the mother country, Spain. Early in this conflict Valparaíso, Chile's chief seaport, was bombarded by the Spanish fleet. This war lasted several years, and finally in 1869 through the intervention of the United States hostilities were ended.

More border troubles. There was trouble with Bolivia over the boundary after the valuable nitrate deposits began to be exploited. A war ensued in which Peru became an ally of Bolivia; the war lasted for three and a half years (1879-1882). As a result of this war Chile secured possession of the Bolivian province of Atacama and Tarapaca from Peru as well as control of the two small Peruvian provinces of Tacna and Arica. These two small provinces became a bone of contention between the two countries for many years. In 1923 the question of ownership was put up to the United States for arbitration. General Pershing was appointed head of the arbitration committee, but no solution satisfactory to both contestants was found. The matter was finally settled in 1929 by the award of Tacna to Peru and Arica to Chile.

Between 1930 and 1932 the country was torn by political dissensions and revolutions, but little blood was shed.

A mountainside country. Chile is a ribbon of land between the Pacific Ocean and the crest of the Andes. It is 2700 miles long and, if placed over North America, would extend from eastern Cuba to the middle of Hudson Bay. Its average width is about 110 miles. Because of its unique shape it has been called the "Shoestring Republic."

From desert to dense forests. The great differences in climate growing out of differences in latitude have divided Chile into three regions: the northern desert, the fertile central valley, and the southern forest region. The winds of the northern desert are the southeast trade winds. In their path across the Andes they leave all their moisture on the Argentine side. Consequently, no rain falls in this northern third of Chile and the country is a desert. The southern



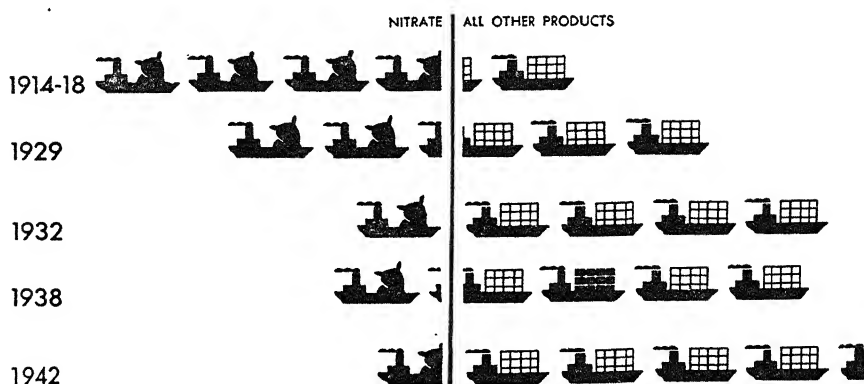
Pictograph Corporation for the Coördinator of Inter-American Affairs

1. Desert and mining. This is the northern third of Chile where it almost never rains.
2. This is the valley of Central Chile which has a climate like that of Southern California.
3. This is the southern third of Chile with a mountainous surface and cool wet weather. The westerlies bring rain from the Pacific.

third of Chile lies in the westerly-wind belt. Here the winds blow from the Pacific Ocean to the highlands and the rainfall is excessive. Central Chile, more fortunate than other sections, has a rainfall like that of southern California or the Mediterranean countries. The winter season is the rainy season. The northward movement of the prevailing westerly winds brings rain to central Chile. In the summer when the wind belt moves south, the region is dry. Because much of Chile is in south latitude corresponding to the location of the United States in north latitude, its seasons are the reverse of ours. Our springs are Chile's autumns; and our winters, Chile's summers.

Eighty-five per cent of the people live in the central region. Its favorable climate and fertile soil have produced a vigorous, enterprising nation. The inhabitants are chiefly of European stock and are

NITRATE IN CHILEAN EXPORTS



Each symbol represents 20% of Chilean exports

Pictograph Corporation

The chart shows that there has been a gradual decline in the quantity of nitrate exported. This is mainly because Chile is obliged to compete with manufacturing plants in the northern hemisphere which produce compounds of nitrogen by taking nitrogen from the atmosphere by means of an electric current.

energetic and progressive. A few native Indians live in the mountains and in the southern area near Tierra del Fuego.

Fertilizer from the desert. In the northern desert of Chile are found the country's most valuable mineral resources. This desert is the world's great storehouse of sodium nitrate, the salt which is so essential in all commercial fertilizers. It is the one place in the world where this substance is found in natural form, and the supply is practically unlimited. Like sugar and salt it is readily soluble in water. A few weeks of heavy rain would wash all this vast wealth into the Pacific Ocean. The dryness of the desert alone makes its existence possible. Some believe that originally the nitrates were brought to this region by underground waters. Then the nitrates crystallized, binding together the loose material into masses so hard that explosives are necessary to separate them again. The beds of nitrate are not continuous but are irregularly distributed from north to south for a distance of more than four hundred miles.

Caliche, or crude nitrate, is found near the surface of the ground. The workmen make use of dynamite to break up the large masses and then, with hammers, break the rock into smaller lumps. It is then loaded upon carts and drawn to one of the many railroads operating in the nitrate fields. The trains deliver the nitrate to refining plants where it is dissolved in hot water and allowed to settle, to separate it from any earthy matter that would adulterate it.

The solution is drawn off into large tanks and allowed to cool. Crystallization of the various salts occurs as a result of the cooling. Common salt, or sodium chloride, is the first to crystallize. The remaining liquid is drawn off from this and allowed to stand until nitrate crystals separate from the solution thus removed. The remaining liquid is drained off and the crystals allowed to dry. Then the next step is to put the nitrate into bags for export.

A new and cheaper process for extracting nitrate from the caliche, known as the Guggenheim process, has been perfected by which more nitrate is recovered at a lower cost. In the preparation of nitrates, a valuable by-product is obtained. This is iodine, of which the nitrate companies of Chile have a monopoly. The quantity of iodine recovered is so great that only a small part is placed upon the market. In this way a reasonable price for the commodity is maintained. Common salt and borax are other useful products of the desert.

Each nitrate manufacturing plant is a small community completely surrounded by the desert. The workers must look to the outside world for all their necessities, for water, food, fuel, even the soil for their small gardens. Water is piped to the settlements from the Andes more than one hundred miles away.

Nitrates are most in demand in the United States and in countries of western Europe which require this commodity for intensive farming and for industry.

During World War I Chile's best customers in Europe were cut off from this supply of nitrates, and Germany, Norway, and others began to manufacture nitrogen compounds from the air to take the place of the Chilean product. Today the major proportion of the world's supply comes from factories in various countries having a cheap source of power in electricity generated by falling water. Chile thus had its output cut to about one fifth of its high point of production. World War II has increased the importance of the natural nitrate.

Mountains of copper. The Chilean desert is also rich in copper ore. The mines were first worked by the Indians; then, in 1601, came the Spaniards; and now, at the present day, the two largest mines are owned and operated by companies in the United States. One of these mines is about 150 miles from the port of Antofagasta. Great masses of ore are blasted from the face of the mountain, and it is moved in trainloads to the crushers. After being crushed, the ore is refined. The electricity used in the refining process is gen-

*Courtesy Grace Line*

Plant of the Braden Copper Company about sixty miles south of Santiago. In these days when copper is in great demand for making war materials, the United States is fortunate in being able to draw on Chile's large output.

erated at the shore with petroleum brought from Peru. The electricity is transmitted to the mines a hundred miles away by currents of high voltage. This method of securing power is cheaper than it would be to send coal or fuel to the mines. The thousands of workers must be made comfortable and kept contented. Special efforts are made to make life in the barren mountains as agreeable as possible to the American engineers and superintendents. Not least among the attractions are high salaries and long vacations. There are good houses, schools, and an excellent hospital. Toward the close of the nineteenth century Chile was first in the production of copper. Today it ranks second, having been surpassed by the United States. Besides copper Chile has deposits of coal, iron, gold, and silver. Over ninety per cent of Chile's exportable products consist of minerals. About eighty per cent of these minerals are nitrates, iodine, and copper. Although it might appear that Chile's desert is really its greatest asset, it is a fact that only a small proportion of its people are engaged in mining or benefit from the industry. It is the foreign owners of both the nitrate and the copper mines who draw the large revenues. Formerly an export tax on nitrates brought much money to the Chilean government. Today the government, in lieu of the export tax, receives dividends from its share of the capital of a com-

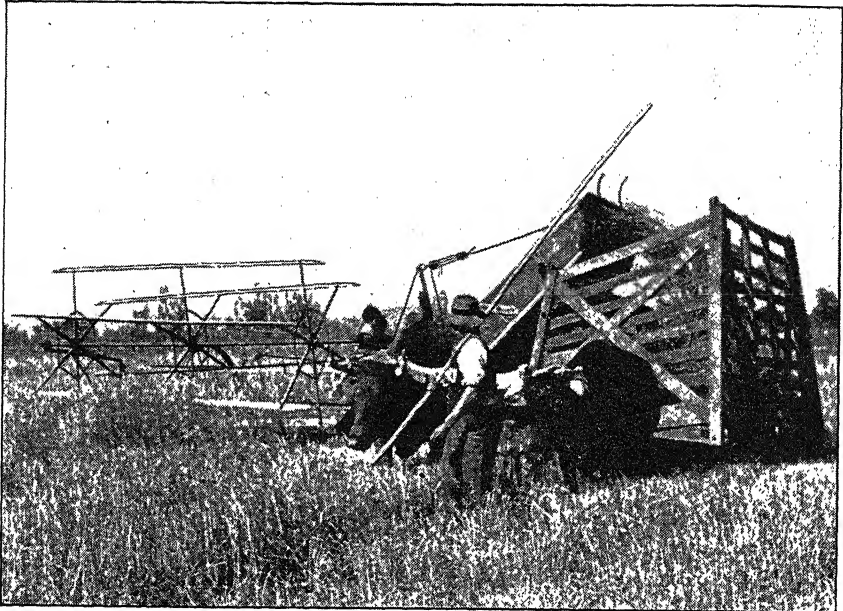


Photo by James Sawyers

Harvesting wheat in Chile with a harvester drawn by oxen. Most of Chile's agricultural lands are in central Chile which has a climate like that of southern California with rainy winters and dry summers.

pany formed by merging all the competing producing companies into a single unit.

Other minerals. Chile has two rich deposits of iron ore in the northern provinces. Both of these are being worked by capital from the United States. Since Chile lacks coking coal for smelting the iron, the ore has been shipped in large quantities in special ore-carrying steamers through the Panama Canal to smelters near Baltimore, Maryland.

South of Valparaíso there are valuable coal deposits. The coal is of moderate quality and in good quantity. The railroads and industrial plants of Chile are the largest users though some is sold in neighboring countries.

Besides copper, nitrates, iodine, borax, salt, iron, and coal, Chile has a variety of other minerals—gold, silver, cobalt, zinc, tungsten, manganese, molybdenum, lead, and sulphur. Probably all of these are capable of much larger development when capital and expert engineering skill become available.

The heart of Chile. With a desert to the north and rainy forests to the south, the central part of Chile has a climate resembling that of the Mediterranean countries. The summer months there are warm

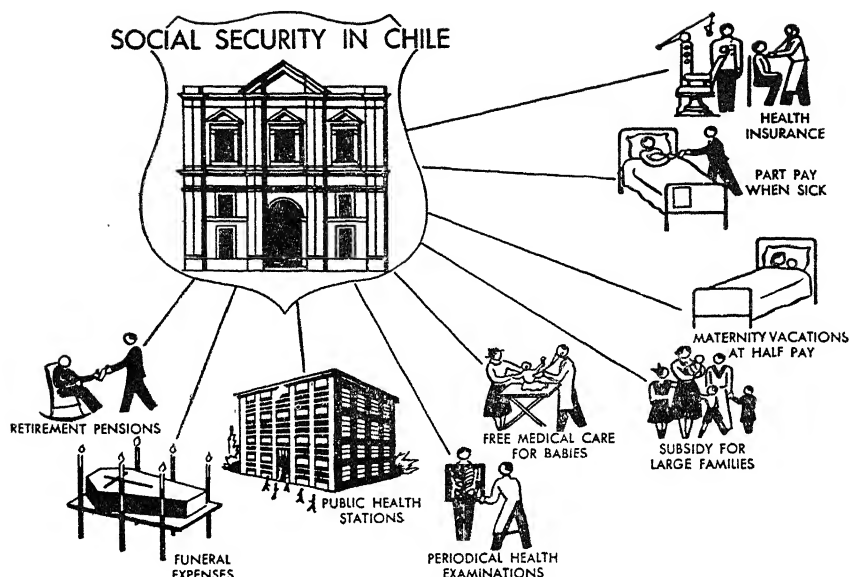
and very dry, especially in the region bordering the desert. Irrigation is necessary to secure good crops. The mountain streams are tapped and the water distributed among the farm lands. The crops consist of the grains, vegetables, and fruits usual to temperate and subtropical climates. Making of wine is an important industry. Attention also is given to the drying and preserving of fruit for home use and sale abroad. Chile practically feeds its people; however, it has to buy elsewhere rice, coffee, tea, yerba maté, and sugar to supplement its food supplies.

Wooded slopes. Because of excessive rainfall in the southern section the soil is saturated with water and the roads are almost impassable. Consequently few people care to live there. Dense forests cover the mountain slopes and the plains. Lumbering is carried on with difficulty during three of the least rainy months of the year. Much lumber in the past has been imported from the United States.

Chile's sheepfold. Farther south the grazing of sheep has become an important industry. As in Patagonia, many of the flocks are in the care of Scottish shepherds who are very skillful in the management of sheep. Wool, frozen mutton, and sheepskins rank high among Chile's exportable products.

Chile's farm problem. Chile at the present time has a problem similar to Mexico's in breaking up the big estates for the benefit of landless farmers. In both countries this has been a difficult matter for the reason that the landless farmer is also moneyless. He has to subsist while he breaks the ground, plants the seed, cares for the growing plants till they mature, and then harvests and sells the crop. This is a matter of months, and the farmer must have seeds and implements provided as well as livestock for draft animals and for food. Then, too, the poor farmer has been accustomed to work under the direction of an overseer and has never had to plan or even use his own judgment. When thrown on his own, it is a great handicap for him to be dependent on a government too poor to provide him with advice such as is given by our various farm bureaus, or to furnish him farm implements even of a crude variety, or to give him financial assistance during his first years of struggle. Yet, both Chile and Mexico are working out this problem patiently and not unsuccessfully.

Chile is also endeavoring to introduce many social reforms as are other Latin-American countries. Notwithstanding its wealth of resources, Chile has been slow to develop local consumer industries.



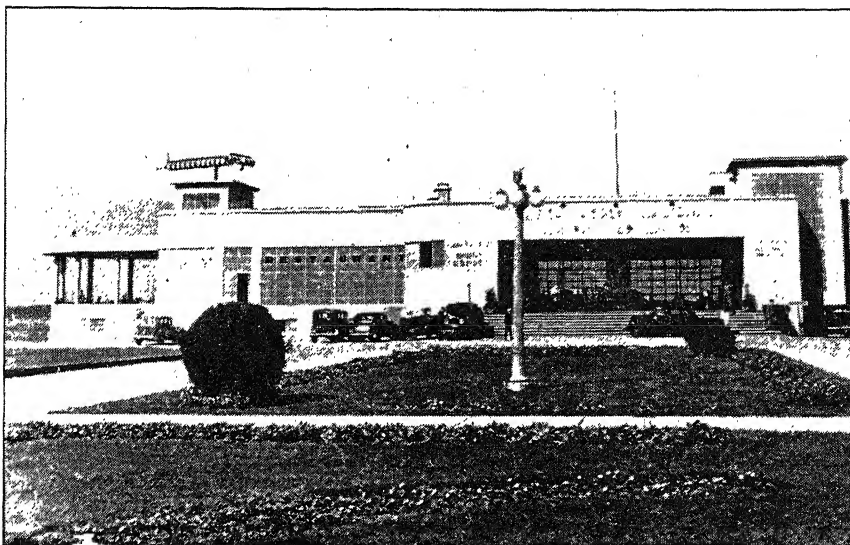
Pictograph Corporation for the Coordinator of Inter-American Affairs

This chart shows the extent to which Chile is looking to the welfare of all its people.

As long as vast sums were derived from its export of nitrates and copper, it seemed easier to import from other countries what was needed since the country lay on an ocean highway and transportation into the country involved hauling imported products only short distances.

It can be confidently predicted that as soon as the war is over the enterprising Chileans will be in the market to buy industrial machinery with which they will manufacture many of the products which they have been accustomed to buying abroad. An evidence of the industrial revolution is the great expansion of Chile's shoe industry and the building of two factories engaged in the manufacture of hardware. Local capital will not be wanting for other industrial enterprises.

Transportation, a problem. Chile was the first South American country to build a railroad, the first line being opened in 1852. Thirty-six years later a real era of railway building began, and there are now more than 6000 miles of railroads in operation, more than half being owned by the state. One of the most famous lines is the Transandine Railway which connects Buenos Aires in Argentina with Valparaíso in Chile. The railroad system of Chile consists of a main line running from north to south, with short lines leading west to the coast and east to the foothills. It is far cheaper to transport



Courtesy Pan-American-Grace Airways

Chile's National Airport at Santiago, one of the show places of Latin-American aviation

goods by water than by rail; consequently the railroads suffer. Besides its seaway transportation Chile has nearly 900 miles of navigable rivers. Santiago, the capital, is the chief railroad center. It is linked by steam and electric railways to all the important cities of central Chile. Roadbeds have recently been much improved by the government. Automobiles are being imported in ever-increasing numbers because of the improvement of highways which provide 25,000 miles of automobile roads. Airplanes serve as carriers of passengers and mail and are used for military purposes as well. The Pan American-Grace Airways has served Chile over a north-south route and over the Andes.

What Chile lacks. Chile is well qualified to become a manufacturing nation. Its cool climate, its hard-working people, its coal, its water power, and its abundance of raw materials—all are in its favor. Nevertheless, there is little manufacturing in the republic. One great disadvantage is its inaccessibility to foreign markets and to sources of raw materials which it might need. Chile must, therefore, obtain abroad many factory products. Iron and steel manufactures, machinery, tools, and textiles are the chief products needed but not produced. The textiles consist of cotton and woolen goods and bags in which nitrates, wool, grains, and meats may be packed for shipping. Petroleum has been obtained from Peru and the United States

for use at the nitrate plants and for generating power to be transmitted to the copper mines.

Chile's ports. The chief port of Chile, Valparaíso (Paradise valley), is located in the fertile central section. It was founded by the Spanish in 1536—nearly one hundred years before the founding of the Plymouth Colony. It is the most important seaport on the west coast of South America.

Antofagasta, Iquique, and Tocopilla are seaports of the desert region for the shipping of nitrates. Chile boasts the southernmost city in the world, Punta Arenas, for a time called *Magallanes*, on the Strait of Magellan. It is the outlet for the prosperous sheep-growing region of southern Chile.

BOLIVIA, PERU, AND ECUADOR

A highland people. The lofty Andes Mountains cross these three countries, and between the ranges are high plateaus. On the west Peru and Ecuador have narrow plains edging the Pacific Ocean. East of the Andes the lower lands merge into the jungle of the Amazon Valley.

These countries make little appeal to white people. Their populations, like other parts of South America excepting Argentina and Uruguay, consist largely of Indians and mestizos. Full-blooded Indians inhabit the plateaus; very backward tribes have settled in the eastern jungles. Indians perform most of the labor and are careless and unreliable. It is not surprising that progress in farming methods is slow.

Copper and tin. The Andes Mountains in Peru and Bolivia hold great wealth in minerals. Four hundred years ago the word "Peru" stood for gold. Pizarro, the Spanish explorer, sacked the Indian cities and sent ship after ship to Spain, laden with gold, silver, and even precious stones. In all, billions of dollars' worth of gold and silver was mined and transported to the mother country.

Today the copper mines of Peru and Bolivia and the tin mines of Bolivia are of more value than gold and silver. The mines are located at altitudes so lofty that both men and pack animals are handicapped by the rarefied air. One great problem is that of transportation—the bringing of heavy machinery up the lofty heights from the coast and the dispatching of the weighty metal to the seaboard. The slopes are very steep and the trails rough. Heavily laden mules and men daily face cruel, well-nigh impossible tasks. American capital is



Photo by James Sawyers

A copper mine at Oroya, Peru. This train load of partially refined copper is leaving for the coast. Each ton of this crude copper contains 400 ounces of silver.

invested in the copper mines, and American engineers have overcome tremendous obstacles to build railroads into the Andes Mountains. The greatest obstacles to the successful development of the Peruvian and Bolivian mines are the costs and difficulties of transportation.

The most valuable product of Bolivia is its tin. This country ranks third in the production of this important metal, British Malaya being first and Netherlands Indies second. Unfortunately today these two important sources are now in the hands of the Japanese. Tin is peculiarly Bolivia's own possession. It is a curious fact that the tin deposits reach, but do not pass beyond the boundaries into Peru or Chile. In working the tin mines the same difficulties are encountered as present themselves in the working of the copper mines. Here too British and American investors own many of the mines. Little smelting takes place in Bolivia because fuel is expensive. It is cheaper to ship the tin to Great Britain, where centuries of experience have made experts in refining and marketing tin. As in the case of the nitrates of Chile, the real wealth of the country goes to the foreign capitalist.

Other minerals. *In Peru.* It has been known for a long time that there are large deposits of coal about 250 miles north of Lima, the capital of Peru. There are also large deposits of iron ore of good

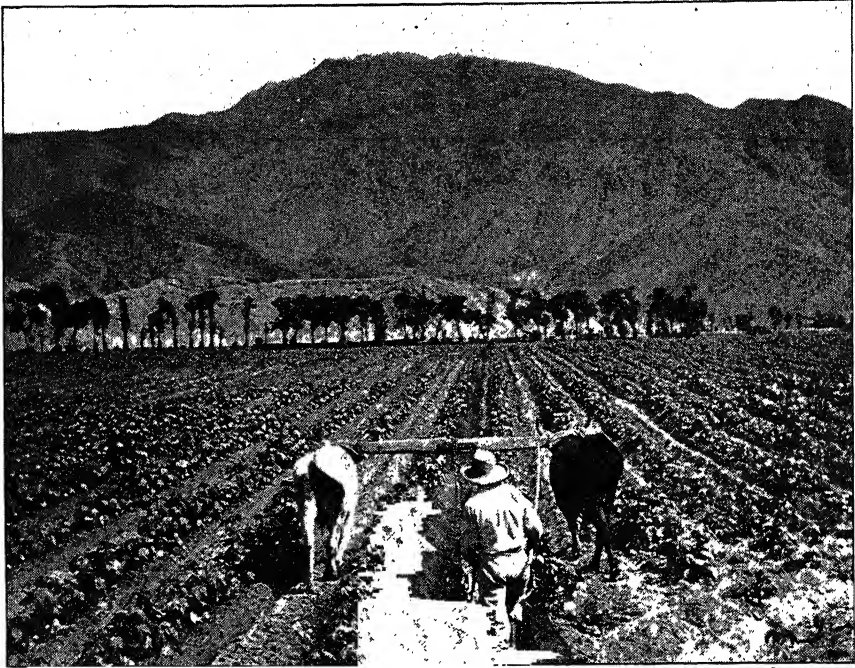
grade about 350 miles south of Lima and only 13 miles from the Pacific. When British and German deliveries of coal to South America were cut off by the shipping shortage and the submarine sinking of merchant ships, and when the United States was unable to furnish steel needed for its war production and that of the United Nations, Peru began to take seriously plans that had been drawn up to develop these resources. Wisely Peru is going to develop the program in piecemeal and has asked Washington for help on the basis that it might be able to supply its own needs as well as those of its neighbors. The coal deposits are to be intensively worked, the railroad that hauls the coal 65 miles from the mines to the port is to be modernized, and Chimbote with its fine harbor is to be equipped with loading machinery to handle the coal as well as the iron ore when barges convey it up the coast to the smelter. These ambitious plans will depend on assistance from the United States and the granting of priorities for machinery and other necessary equipment.

In Bolivia. Bolivia, too, has other mineral resources. In fact, almost all known minerals have been found in its mountains. It is still an important producer of silver as it was in the days of Spanish exploitation. Ores of wolfram, lead, antimony, bismuth, and zinc have been among its exports. Platinum, a metal more valuable than gold, is mined there. Large deposits of salt and petroleum fields have been located in different areas.

In Ecuador. The minerals of Ecuador that have been developed or are capable of developing commercially are gold, mercury, copper, iron, lead, and coal. There are also large deposits of sulphur. Silver and petroleum also exist and emeralds have been found.

Farming, the chief occupation. Only a small number of the people are miners; the vast majority either graze cattle on the plateaus or are engaged in farming. Only a few crops, such as grains and potatoes, will grow on the cold and lofty plateaus. The methods of farming are crude; except for the plow, no modern farm tools are desired. It is no wonder that the Indian makes but a precarious living.

Products of the coast. The Peruvian plain along the Pacific is narrow and dry. The mountain streams have been utilized to irrigate some of this region. Guano from the islands off Peru and nitrates from Chile have fertilized the soil. Excellent crops of cotton and sugar cane are raised. A cotton plant here will bear for several years; in the United States cotton must be planted every year. Cotton and sugar make up about one third of the exports of Peru.



Courtesy Grace Line

Primitive farming methods used by Peruvian Indians. The soil of this valley has been washed down from the highlands through ages of erosion.

Britain has been the greatest market for the cotton while the raw sugar is imported in large quantities by the neighboring republic of Chile.

Petroleum occurs in considerable quantities in northwestern Peru near the coast. The oil is of fine quality, with large percentages of kerosene and gasoline. The location of the deposit greatly reduces the cost of transportation. Petroleum with its products has been the greatest export of Peru. Gasoline, kerosene, and fuel oil are sent to Chile for use in the nitrate plants.

Developing the hinterland. Peru in the past has imported many of its food requirements, especially for its urban population which is located favorably for ocean transportation. Other products have been secured from farms in the upland valleys or in the irrigated areas. The Peruvians today are studying the possibility of developing larger irrigated areas on the western slopes of the mountains to render them independent of foreign sources for food. Peru is also opening up its interior—the vast rain-drenched tropical area east of the Andes that slopes down to the headwaters of the Amazon and its tributaries. This work has been facilitated by a project started



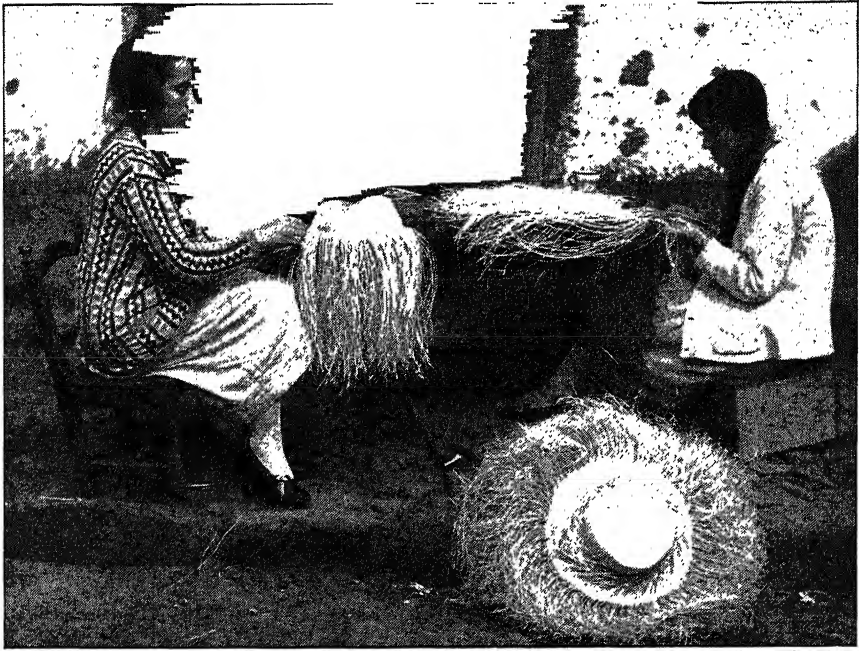
Courtesy Grace Line

Cacao beans spread out to dry in the sun. Workmen are sorting the beans at the port of Guayaquil.

before the war; namely, the construction of a road from Lima over the Andes and through the jungles to a point less than 200 miles from a port on the Amazon River.

Experts from a big, new agricultural experiment station are searching the jungles for tropical products that may have commercial value; on an experimental farm rubber seedlings are being cultivated. Native farmers are being taught how to clear the jungle and grow the foods that formerly were imported. Experiments are being carried on with new crops never grown before, and native crops that have been neglected are again being reintroduced. Such a one is the growing of the cinchona tree, from whose bark quinine is obtained. The potency of quinine as a cure for malaria was first discovered by the Indians of Peru who drank the water in which they had steeped the bark of the tree. Today scientists are searching the jungles for the highest yielding cinchona trees and are growing seedlings of the best varieties. There is little doubt that Peru could supply from plantations properly cared for all the quinine needed by all the people of the Americas.

Ecuador's industries. More fortunate than Peru, Ecuador has a

*Photo by James Sawyers*

Ecuadorean girls weaving Panama hats. Some weave while others bleach and shape them.

coastal plain with an abundant rainfall except in the south. On these low plains are plantations of cocoa trees whose product, the cacao bean, has been Ecuador's leading export. Two pounds of dry beans a year is the average yield per tree. Once Ecuador stood first in the raising of cocoa; but haphazard methods of cultivation combined with a disease that ravaged the trees have given the leadership to other parts of the world. Coffee is raised on the western mountain slopes. Ecuador has exported annually about \$2,000,000 worth of coffee. A unique article exported has been the Panama hat, so light in weight and desirable for summer wear. These hats are woven with painstaking care by Indians. The early morning or late afternoon, when there is some moisture in the air, are the times of day that insure the best work. The Panama hats are of excellent quality and of interesting designs. The name was given them because they were shipped to North America by way of the Isthmus of Panama. Another important product of Ecuador is the nut of the ivory palm. Following the flowering of the palm, a rough brown bur appears which when mature contains 60 to 90 nuts as large as walnuts. The kernel of these nuts when dried becomes a hard white composition so ivorylike



Courtesy Pan-American-Grace Airways

A Panagra transport plane. The only highway over much of the Andean region is that of the upper air. Supplies of all kinds are carried by freight planes in all the Andean countries.

that it is called *vegetable ivory*. The nuts are used as material for buttons. The texture of the nut is such that it absorbs dyes readily and can be given a permanent high polish.

Ports of Peru and Ecuador. The Pacific Coast as far south as Chile is lacking in good harbors. The one exception is the Gulf of Guayaquil, running inland for one hundred miles. It belongs to Ecuador.

Guayaquil, on the Gulf, is the port from which this little republic has sent its cocoa, coffee, Panama hats, and other products to foreign countries. Bolivia has no port, but has had to depend upon the ports of Chile and Peru. Recently President Vargas has made a Brazilian port available for use by Bolivia. By use of these ports Bolivia has access to both the Atlantic and Pacific Oceans. Callao and Mollendo are the Peruvian ports. With the exception of Guayaquil the harbors are too shallow to admit vessels of deep draft. The ships must anchor at some distance from the shore. Then their cargoes are unloaded upon small boats of light draft, called *lighters*. These lighters transfer the goods from the ship to the city wharves. This handling is often careless so that it is imperative that the goods



Courtesy Caterpillar Tractor Company

Mining machinery brought by plane is being drawn by man power up the steep mountainside from the air field to the mine in the Andes.

should be carefully packed to withstand such rough treatment. Each of the above ports is the terminus of a railroad. Pan American-Grace Airlines are supplying much needed transportation in these three countries as well as in Chile. Even heavy mine machinery and other supplies are being carried to the mines in the lofty Andes where transportation was formerly only by sure-footed beasts of burden like the llama or on the backs of men. Vitally needed minerals for war purposes are likewise being sent to the United States by airplane. The part aviation is to play in these countries after the war can only be surmised. One thing is sure: There will be a much more rapid development of their rich resources and they will be better customers for the manufactured products of industrial countries as a result of the closer contact they will have by virtue of air routes traveled by huge transport planes.

GUIDES TO STUDY

1. Why is the climate of northern Chile different from that of central Chile? Of southern Chile?
2. Why might central Chile be called the Southern California of Chile or even Mediterranean Chile?
3. What has the climate of northern Chile to do with the preservation of the nitrate deposits?

4. Describe the methods used in preparing nitrate for market.
5. Why is the nitrate industry of Chile of less importance than in former years?
6. How is it possible to mine copper ore with profit when there are only a few pounds of pure copper in each ton of ore?
7. Why is Chile's production of copper particularly valuable at the present time? (See p. 230.)
8. Why do most of the inhabitants of Chile live in the central part of the country? Why might this region be called the heart of Chile?
9. How does the normal foreign trade of Chile differ from that of Argentina? Explain.
10. Why are there relatively few white people in the Andean countries?
11. Why have the Andean countries progressed much more slowly than Argentina?
12. What are the mineral products of each country? Why are the minerals used largely in foreign countries?
13. Where is Bolivian tin now being smelted? Why?
14. What are the chief ports of western South America? What are the leading exports and imports of each port?

TOPICS FOR CLASS DISCUSSION

1. Chile's early history. Later boundary disputes.
2. Effects of the shoestring shape of Chile.
3. Problems of the Chilean farmer.
4. Manufacturing in Chile.
5. Chile's railroads and air lines.
6. Bolivia's lack of seaports.
7. The Peruvian coastal desert.
8. The coastal plain of Ecuador.

WORK TO BE DONE

1. Make special studies and report to the class on each of the following topics: (1) The value of Andean products to American industries; (2) American investments in Andean countries; (3) Why the tin ore of Bolivia was sent to England before it was shipped to the United States; (4) The value of the desert to Chile; its value to Peru; (5) Has the Panama Canal been a help or a hindrance to the development of the west coast of South America?
2. Who were the Incas? Make a brief report of their civilization.
3. Review all references to aviation in the sections of this text on South America. Use the index and find other references to aviation in relation to South America. Write a brief paper telling the progress the South American countries have made in aviation and what the future prospects are.
4. List the strategic materials which South American countries furnish the United States. (See p. 216.)
5. Draw carefully a map representing Chile and the Andean Countries. On this map indicate the locations of each of the leading products and the most important cities. Trace the route from a port of Chile to the Panama Canal.

PART FOUR. EUROPE—A CONTINENT IN TURMOIL

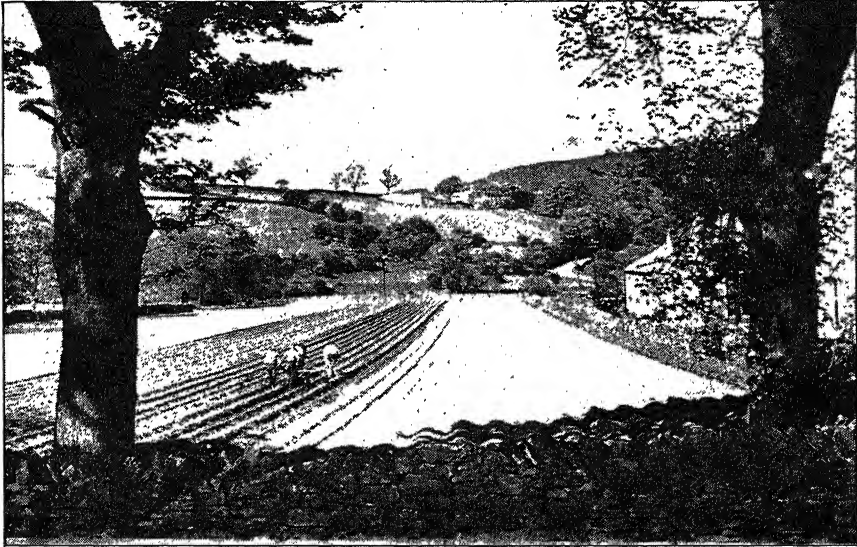


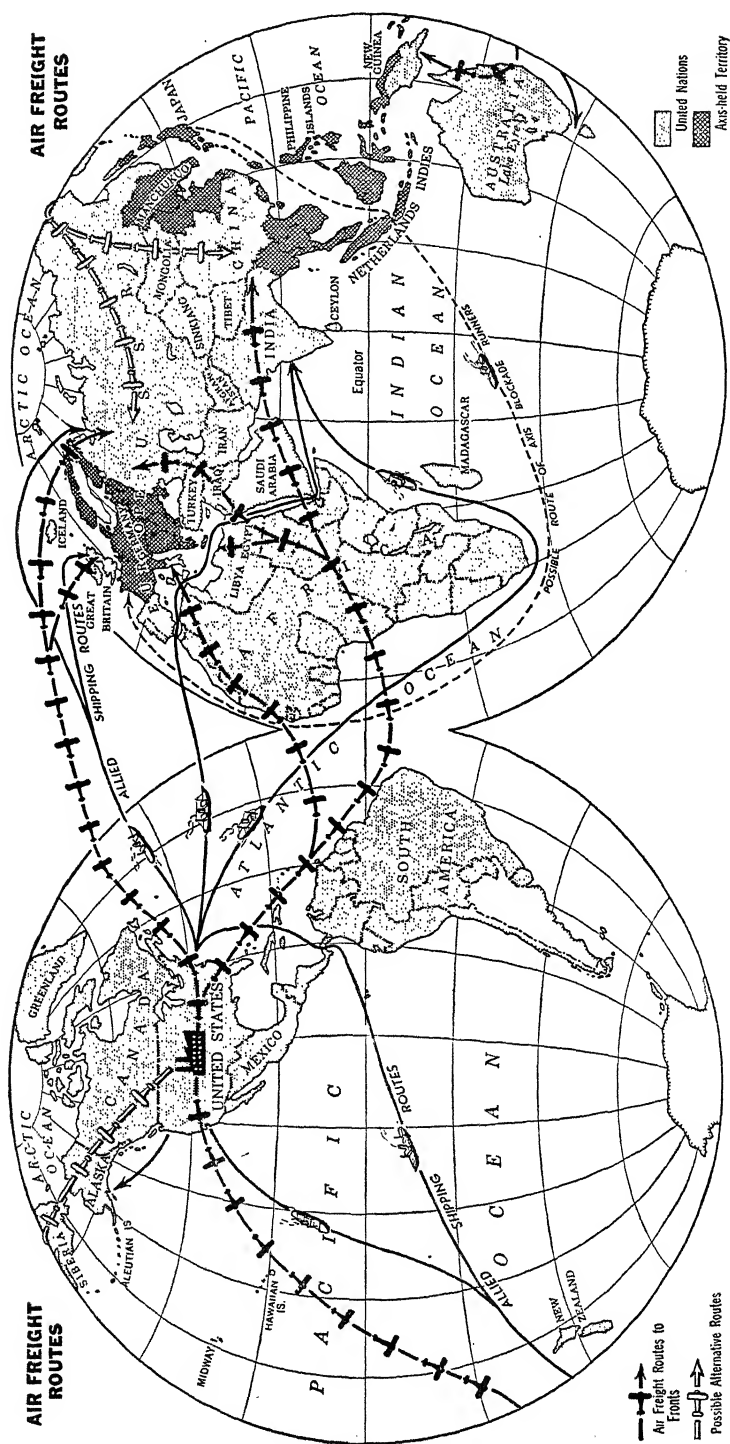
Photo from Keystone View Company

A farm scene near Derby, England. Derby is not far from the southern end of the Pennine Chain of mountains. The more food that Britain can produce on farms like this the less the need of imports from distant lands.

UNIT XVI. EUROPE AS IT WAS AND AS IT IS

Europe as it was. We have become so accustomed to thinking of Europe at war that the peacetime Europe of the early 1930's has almost faded from our minds. From time to time a picture of former Europe flashes through our minds like a dream which we long to see realized. That Europe was a land of happy country homes and busy factories turning out products for peacetime uses—a land whose railroads and ships passed freely from country to country—a land whose people were free to travel to other countries and who in turn entertained tourists from all parts of the world and received a large income from that industry. Throughout this seemingly peaceful Europe little was heard of race hatred or difference of religious beliefs.

The Treaty of Versailles had drawn new boundaries so that in so far as possible the people of a given race could govern themselves. This same treaty provided a League of Nations for the purpose of



settling peaceably any differences that might arise. The United States was drawn into World War I believing that it was a war for democracy for a large part of the world and that it was a war to end wars. This was our first attempt to settle Europe's problems which, as we are slowly learning, are the world's problems and our problems too. Probably no one living in 1930 could have imagined that the Europe of that time could become the Europe of today.

The influence of a Europe at peace. Europe at peace meant, in the main, a world at peace. As we have seen, we in America felt that World War I would be the end of war on a large scale for a long time to come. Agreements with other nations led to a limitation of armaments. We did not fear attacks from the East or from the West. It was impossible to induce the Congress to pass a bill even to fortify properly our islands in the western Pacific. A service man in uniform was rarely seen on our streets.

Practically all of our resources and energies were devoted to the art of peace—to turning out those products useful in everyday life. We heard nothing of lend-lease, of rationing, of the conservation of rubber, gasoline, fuel oil, and kerosene, or of air-raid precautions, of enlistments, of drafts, of war stamps, and war bonds, nor of war taxes. We were free to drive our cars where and when we pleased and almost as fast as we pleased. All these good things and the absence of the bad ones we enjoyed because the world, especially Europe, was at peace. When the world is at peace, America is prosperous and happy and, unfortunately, unmindful of its world-wide responsibilities. It is only when a European war becomes ours, as it is sure to be, that we are stirred to a realization of our close relationship with world affairs, of our corresponding responsibilities, and of the impossibility of our maintaining an attitude of isolation.

1. GREAT BRITAIN—AN EMPIRE AT STAKE

British names and their meanings. The *British Isles* consist of two large islands, Great Britain and Ireland, the Channel Islands, and numerous small islands lying off the north and west coasts. *Great Britain* comprises England, Scotland, and Wales. *Ireland* comprises Northern Ireland and Eire. *Eire* has a status similar to that of the self-governing dominions, but with slight differences. In the new constitution for Eire, there is no mention of the King. The full measure of its independence is shown by its decision to maintain neutrality in the present war. The *United Kingdom* consists of Great

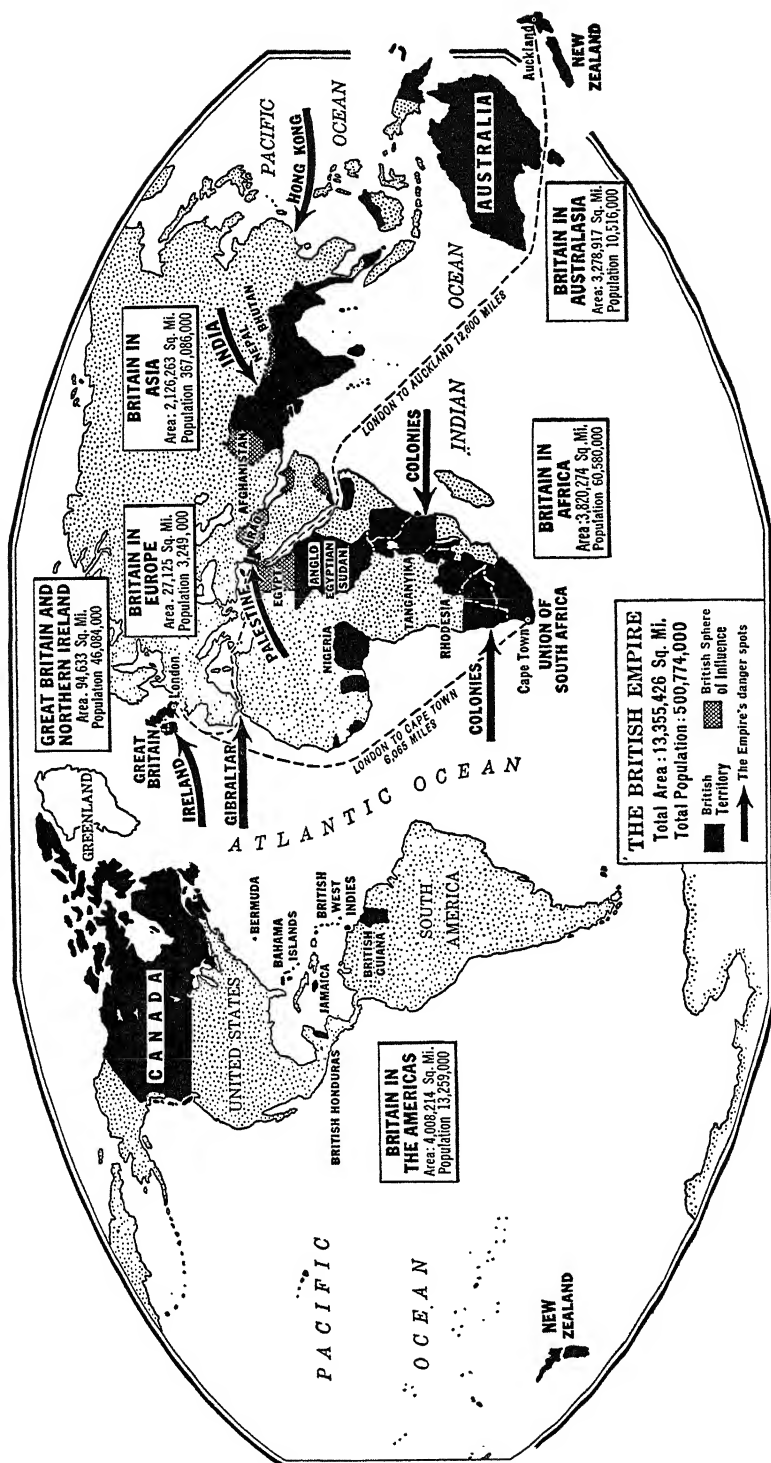
Britain and Northern Ireland (six counties of Ulster). The *British Commonwealth of Nations* consists of the United Kingdom and the dominions. The dominions are self-governing and comprise the Commonwealths of Canada, Newfoundland, Australia, South Africa, and New Zealand. The *British Empire* comprises the British Isles, the dominions, Eire, India and Burma, the colonies, the dependencies, and the protectorates. We shall use the name Great Britain as meaning the United Kingdom, that is, the mother country.

Why we are interested in Great Britain. Great Britain is our mother country. The thirteen original colonies were almost wholly settled by British people. Settlers from the East moved on to the Middle West and thence to the shores of the far Pacific, carrying to all quarters of our broad land English speech, laws, and traditions. Our institutions are modeled after those of Great Britain. We claim our heritage in its great literature and in the high development of English freedom through a long historic past.

North, south, east, west—no corner of the world is beyond the influence of the British Empire. It covers about one fourth of the earth's surface, and British subjects number more than one fourth of the world's population. It is a well-known truth that the sun never sets on the British flag. Because of the empire's extent and because of its numerous and powerful ships Great Britain has been called the "Mistress of the Seas." In dealing with its overseas possessions, its policies, often faulty and selfish in the past, have become, in time, a standard for other nations to follow in ruling their colonies. British statesmen, whether from the mother country or from the dominions, play an important part in all international conferences. No wonder the United States is keenly interested in the policies of the other English-speaking nation, a great world power and the most democratic country of Europe.

BRITAIN IN WORLD WAR II

The "Silver Streak." Britain owes much to its nearness to continental Europe, the world's leading industrial and commercial continent. It has been fortunate, however, in being separated from the mainland by the North Sea and the English Channel, a narrow strip of water known as the "Silver Streak." Before the coming of the submarine and the airplane these protecting waters freed Britain from the necessity of spending money for large armies and munitions for the defense of its frontiers. Britain could use its funds instead for



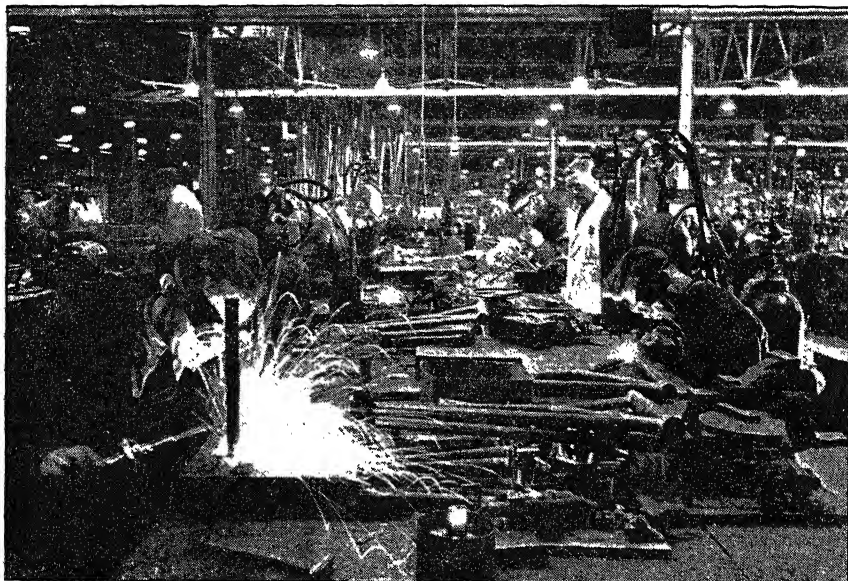


Photo from Black Star

Making parts of Lancaster planes for the Royal Air Force. Practically all parts of the plane are welded together. Here welding is being done by the use of the oxyacetylene torch.

developing its industries and trade. This gave it a great advantage over its continental neighbors.

A mistaken feeling of security nearly cost England its life. Strong in the belief that Germany and Russia would fight it out on the eastern front Britain listened to those who counseled "Business as usual" until it was almost too late. In the summer of 1940 Denmark was occupied overnight, Holland was overrun in three days, and Belgium in less than four weeks. France was conquered in almost as short a time, and the enemy paused only to take breath in preparation for an invasion of England itself. Then the thoroughly aroused Britishers began to realize that they might have to fight it out on the beaches and the streets, with nothing but clubs for weapons. All their weapons and ammunition had been left on the battlefields and beaches of northwestern France. They began frantically to arm. Only vital industries were allowed to continue and the whole man and woman power of the nation was mobilized for an all-out war effort.

Britain's back to the wall. For a time Britain was fighting—fighting alone—literally with its back to the wall for the preservation of the homeland, the heart of the British Empire. In fact it might have been pinned to the wall had not the Nazis made the mistake

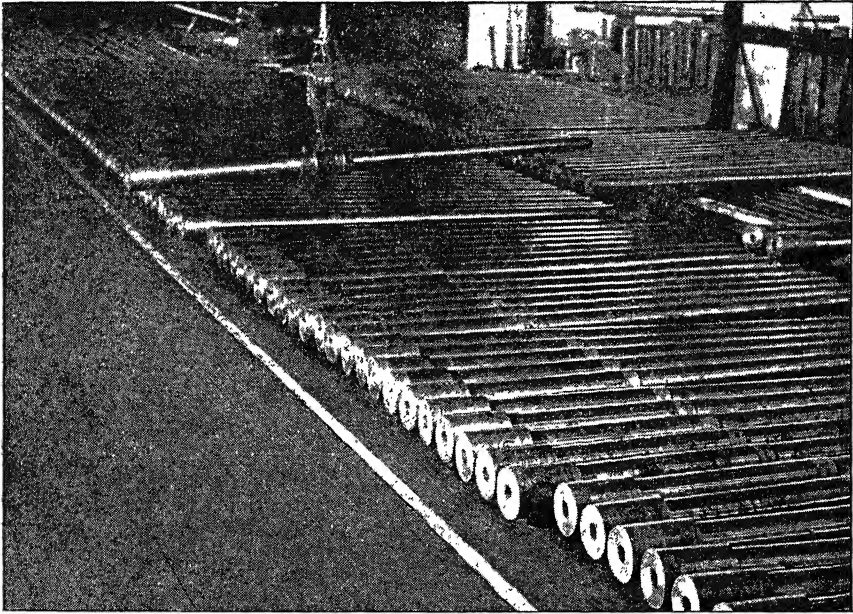


Photo from Black Star

Barrels of anti-aircraft guns made in a Canadian plant for use in England. These are rapid-fire guns made of the finest steel and with the best workmanship.

of attacking Russia. That error brought Britain a stronger continental ally than it had ever dreamed of having. Our entry into the war as an ally after Pearl Harbor was warmly welcomed by the British, yet it was not an unmixed blessing, for with that event the war became a global war and Britain found itself fighting not simply for the homeland, but for the defense of the whole far-flung British Empire.

While from the beginning Britain had received sympathetic support from the greater part of the empire, it was not until the colonies and the dependencies were themselves endangered that they really girded themselves for an all-out war effort. Now, with the exception of Ireland, which has remained neutral, and India, which is giving only half-hearted support, the forces of the whole empire are advancing as a single army. Hard-pressed Australia and New Zealand have sent troops to North Africa and the Far East; Canadians have fought on all fronts; South Africans have done their bit; and Indians have fought in Syria and on the battle fronts nearer home. Our forces in North Africa and the Mediterranean worked with the British under a single command to defeat the European partners of the Axis. In China and the Pacific area, including Australia, we are united in a

single purpose—to bring about the unconditional surrender of the Japanese.

Britain aided by conquered countries. A number of the nations of Europe which lost control of their homelands have established governments in London. These governments, as best they can, work for the interest of their people at home and direct in some measure the affairs of their foreign possessions. Included in these governments in exile are those of Norway, Poland, Czechoslovakia, Belgium, the Netherlands, Greece, Yugoslavia, and Free France. Since "D-day" the French have set up a government in Paris. The heads of the other governments return to their homelands as soon as liberation occurs. All these governments are doing everything in their power to aid Britain in its war with Germany and Japan. Those merchant vessels which were not captured by Germany are busily engaged carrying supplies of all kinds for the Allies to all parts of the world. The Norwegian fleet alone, thus employed, numbers 900 ships manned by 25,000 Norwegian sailors. Young men from these conquered countries trained as pilots are flying with the British air force over German-controlled Europe. Such help as this, together with the resistance offered to German control in the conquered regions themselves, strengthens the British fighting arm and gives the British people courage to believe that a new day is dawning for Europe and the world.

Britain streamlines for war. Had Hitler realized England's defenseless condition following Dunkirk, he would no doubt have attempted an invasion at once with excellent prospects of success. His failure to do so was Britain's salvation. The country immediately converted all its resources and industries to preparation for defense and offense. All cliffs and beaches were defended by barbed wire and gun emplacements. Like the United States Britain is essentially a manufacturing country. It was a comparatively simple matter to turn its great plants from the production of goods for civilian use to those needed for war.

The need of planes. Hitler had told Prime Minister Chamberlain that London would be bombed if Britain attempted to thwart Germany's plans in Central Europe. He carried out his threat. For three months Britain was subjected to severe bombing by day and by night. But in the meantime war production in Britain continued with feverish haste. There was only one thing to do—to get planes, to build them and to buy them—planes to defend the homeland and planes later to be sent against Germany and the lands occupied by

Hitler. So successful were their efforts that during the year 1941 Britain exported five planes for every one imported. Even before the entry of the United States into the war Britain placed orders for planes with American manufacturers, at first paid for by the British Government and later by lend-lease agreement. As the months and years have passed British plane manufacturers have built more, larger, and stronger planes. The Lancaster, for instance, carries seven tons of bombs and has a flying range of 3000 miles.

Tanks, guns, and ammunition. What the British plane manufacturers are accomplishing British makers of all other types of equipment are doing equally well. Their plants are working for Britain's allies, as well as for Britain's armed forces. Even before the end of 1942, there had gone to Russia 3000 planes, nearly 3000 tanks, and 70,000,000 rounds of small ammunition, besides many other supplies. In the North African campaign some of the American forces were equipped with British twenty-five-pound guns.

British ships and shipping. For many years Britain's navy and merchant marine led the world. Glasgow was long recognized as the world's leading shipbuilding port. With Britain's entry into the war, the country needed all its naval vessels to defend the homeland and its far-flung possessions. Ships were needed to enforce the blockade which the British Government had declared with the purpose of preventing trade between Germany and other countries. Six hundred British naval vessels must be constantly on duty to cover 80,000 miles of sea routes. The duties are varied, including patrolling, convoying, and fighting. More than 250,000 men of the British Navy are serving on Atlantic lanes alone.

Merchant ships are needed to meet Britain's usual needs and also to carry the many war supplies necessary to feed and equip the armed forces. Furthermore, with the entry of Russia into the war many ships were needed to transport supplies to that country either by way of the Murmansk coast or around Africa to the Persian Gulf. We need to recall that Italy had practically closed the Mediterranean to all Allied shipping. The 11,000 mile voyage around Africa was the equivalent of reducing by one half the ships available for carrying goods to the Far East. With the Mediterranean closed 300 ships were required to keep Britain's own Far Eastern forces properly supplied. The clearing of the Mediterranean after the fall of Tunisia was equivalent to doubling the number of ships. Great demands are also made on Britain's shipyards by the frequent sinking of British merchant ships by German submarines.

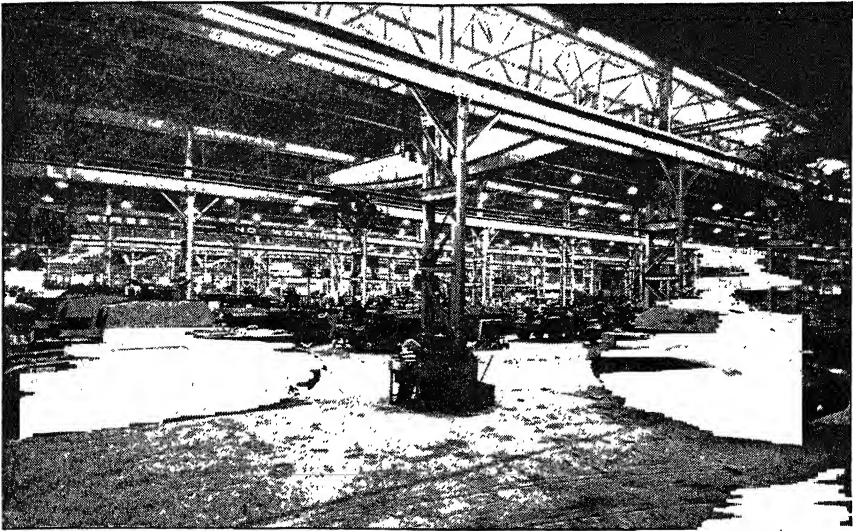


Photo from Black Star

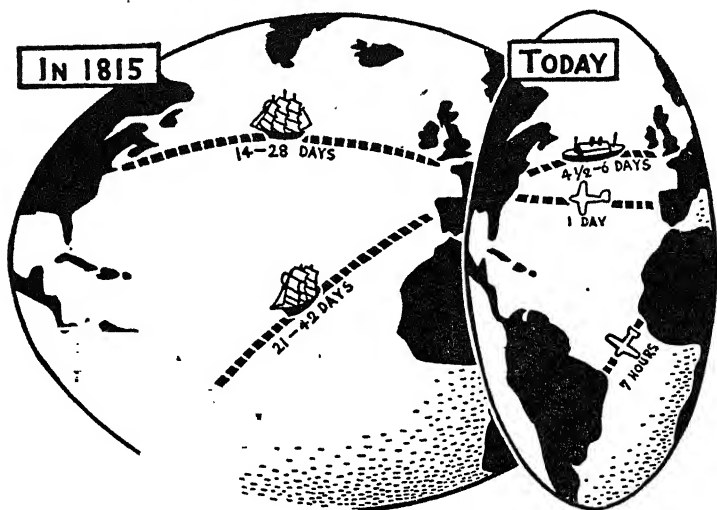
An English assembly plant showing finished tanks ready for a field test

From peace to war. It is easy to see that Britain's rapid advance in war industries was made possible by peacetime occupations. The country had extensive manufactures of iron and steel products at Birmingham, Newcastle, Sheffield, and many other cities. Textile machines were made near the textile centers of Lancashire around Manchester. Workmen are highly skilled in all metal industries; thus it was easy to turn to the construction of planes with their almost mechanically perfect engines. The well-known Rolls-Royce engine is an English product. The same skill and resources led to the production of tanks and trucks. From time immemorial the British have built and sailed their own ships. All these occupations are closely related to Britain's location, climate, and natural resources, some knowledge of which must be gained if we are to understand Britain's strength both in peacetime and in war.

ADVANTAGES AND RESOURCES UNDERLYING BRITISH INDUSTRIES

A favorable location. In early times, when the Mediterranean Sea was the commercial center of the world, Great Britain was definitely out of the picture. But with the discovery of America all that was changed. The Atlantic became, in time, the busiest ocean of all. Great Britain, nearer to America than most of the continent, stood then at the front door of Europe. Far-flung trade lines center there. There is the profitable commerce with Canada, the United States,

HOW THE WORLD HAS SHRUNK



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and South America, the Panama Canal giving easy access to the western coasts of America. The continent of Africa is easily reached. Asia is just around the corner of the Mediterranean Sea and the Suez Canal. Nearer home Norway, Sweden, Russia, and the Baltic States are reached by cheap water routes.

As an aviation center Great Britain has a most favorable location. A study of a polar map shows that of all the important nations of the earth none possesses a more advantageous position than does Great Britain for air connection with all parts of the globe. From any one of its airfields it is only a matter of minutes to continental Europe, of a few hours to the North American continent—recently one flier made the round trip four times in three days—and a little more than two days to any part of the world. Already questions have arisen as to whether in the coming air age the planes of one nation will be permitted to fly over the territory of another nation. Britain with its far-flung possessions is especially fortunate since its airships will be able to go to almost any part of the world over British territory. Likewise British airfields will be widely scattered, so that for the accommodation of its planes there will be little dependence on other nations.

A fostering climate. The British Isles have a mild but stimulating climate. The mild winters and cool summers are due to the westerly winds, blowing for many miles over the Atlantic Ocean.

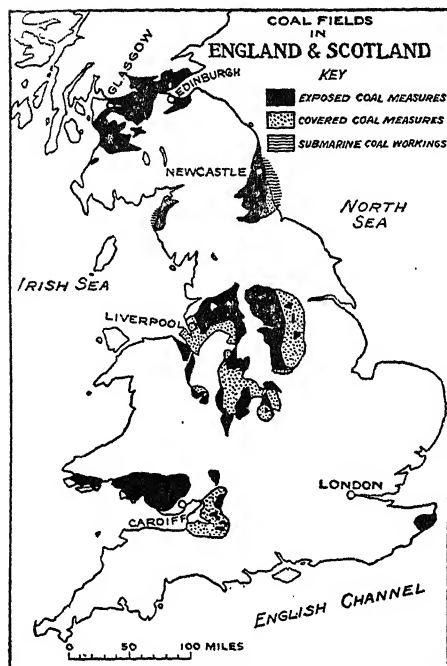
Ocean waters are never so cold in winter or so warm in summer as is the land in the same latitude. Therefore the British Isles, being set in the ocean, do not experience the great seasonal differences in temperature common to inland regions.

Both farming and manufacturing are helped by a mild temperate climate. Farmers can work out of doors all the year round. In summer British factory workers suffer little from the heat. In northern Scotland the period of sunlight in winter is only five and one-half hours. In summer the days are more than seventeen hours long. Then it is possible to read and write outdoors long after ten o'clock at night. The high latitudes of Great Britain account for these curious seasonal differences. Its southern coast is a little farther north than our Canadian border.

The rainfall is heaviest on the western coasts, Ireland especially having the greatest rainfall of all. So green is its grass and so verdant its ivied walls and trees that it has been appropriately called the *Emerald Isle*. The luxuriant growth of grass offers fine pasturage for cattle and sheep. Toward the east the lighter rainfall gives excellent conditions in both England and Scotland for the growing of wheat. Southern England has very little snow. Indeed the southwestern counties have been called the *Florida of England*. The moist air from the sea is responsible for the disagreeable "pea-soup fogs," or "yellow fogs," that occur in London during the fall and winter. These in themselves would not be so disagreeable, if it were not for the soot and smoke which fill the air and coat everything they touch with their grimy deposit.

A pioneer in industry and commerce. The early Britons were sea rovers. They were a fearless, hardy race who discovered many new lands which they claimed for their own. In these colonies they built forts and trading posts and exchanged goods with the native peoples. They gave them cloth, trinkets, knives, and weapons and received in return furs, spices, precious metals, and other valuable products. This trade increased so rapidly that in time the demand for such goods far outran the supply. Necessity is the mother of invention. To meet this increased demand, the British invented machines by which their output of goods could be multiplied many times.

In England were built the first machines for spinning and weaving and the first steam engine. Muscles were displaced then by water power and by steam. Coal and coke were used there for the first time to smelt iron and make steel. These events marked the



beginning of the great industrial revolution which began about the middle of the eighteenth century. The evolution of the British Empire was vitally affected by these profound changes in British industry.

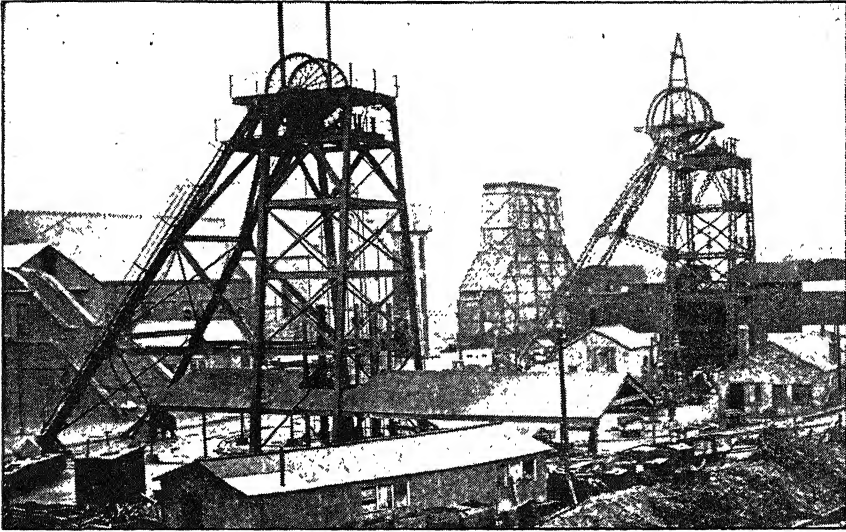
A greatly increased supply of goods made new markets necessary. Colonies were built up in distant lands to increase British trade. With the wealth resulting from this commerce, Great Britain was enabled to conquer new lands and to fight successfully any enemies opposing its progress. So the cycle of trade advanced: new colonies, more

trade, greater wealth, still more new territory. The colonies sent to the mother country food for workers and raw materials for factories. In return the mother country shipped manufactured goods of all sorts to the colonies. British money came to be invested in colonial enterprises. Many Englishmen migrated to the colonies where, of course, they still remained British subjects.

Rich coal mines. One of the chief sources of wealth in Great Britain is coal. Only Germany and the United States mine more coal than Britain. The industrial life of Great Britain, a large part of its export trade, and its military and naval strength rest to a considerable degree upon its enormous supplies of coal. About three quarters of a million British workers are engaged in this industry.

From coal to gold. The great coal deposits have determined the centers of industry. The map indicates four of these: the Scottish lowlands, Newcastle, the Midlands, and South Wales. The coal fields of southern Scotland form an almost continuous belt, stretching for over ninety miles from coast to coast. On its western seaboard lies Glasgow, the greatest shipbuilding center of the world. Glasgow and its neighboring cities form a great manufacturing area.

Newcastle lies near great coal fields and, close at hand, are deposits of iron ore. Here is a great iron-steel manufacturing city.



© Associated Press Photo

One of the coal mines, near Wrexham, in north Wales. Welsh coal has been sold all over the world by the British.

Because of Newcastle's nearness to coal fields and its great docks on the Tyne, coal is in normal times exported to lands across the North Sea—to Scandinavia, Finland, and the Low Countries. This wealth in coal deposits gave rise to the old saying, "Don't carry coals to Newcastle." Shipbuilding is another activity of this flourishing city of almost 300,000 people.

South Wales has large and very rich deposits of coal. Cardiff was at one time the leading coal port of the world. Over forty per cent of Britain's exportation of coal was shipped from there, and it is also a coaling station for steamers.

Coal has been justly called "the cornerstone of British industries." Coal has brought the people more wealth than mines of gold and silver. For generations the ingenuity of the British nation has been transforming coal into gold which has financed industries at home and abroad.

Multiple products of iron and steel. From Britain's large and numerous iron and steel plants have come implements for the farm, machinery for the mills and factories, locomotives, cars, ships, and a vast quantity of metal articles for export. Birmingham, Manchester, and Sheffield are three leading manufacturing cities. Birmingham stands first in the making of hardware. As Manchester is a great center of textile mills, that city naturally makes textile machinery.



Photo from Black Star

Inspecting guns to be used on British naval vessels. The plant is at Sheffield which has been noted for many years for its fine steel products.

Sheffield is celebrated for its cutlery. Glasgow makes engines for steamships and builds ships of iron and steel that have displaced the wooden vessels of the past. Shipbuilding is also carried on in Belfast, Northern Ireland, in Newcastle, and in other cities of the northeast coast. Surely British industries and trade have a firm foundation, being built on coal, iron, and steel.

Cotton and woolen goods. Cotton cloth, woolen goods, and linen are the leading textile manufactures of Great Britain. For years raw cotton was the chief import and cotton goods the greatest export. No other country equaled Britain in the value of the cotton goods and woolen goods manufactured and exported. Four favoring conditions gave Britain its early industrial start: its abundance of coal, its favorable climate, its early employment of machines, and its skilled workers. Raw materials and markets for manufactured goods were readily found in the colonies and in foreign countries, thanks to Britain's carrying trade.

The Lancashire district about Manchester is the great cotton center of England. In the early days the mills were run by water power from the short, swift streams flowing down the western slopes of

the Pennine Chain. Later, coal was found close at hand and steam then largely displaced water power. Access to the sea was needed and so, in 1894, the Manchester Ship Canal was built to Liverpool. This made it possible for large ships, laden with cotton from the United States and other countries, to unload their cargoes almost at factory doors in Manchester. The city thus became a distributing center for the entire region. Britain's chief centers for the manufacture of woollen goods are Leeds and Bradford to the east of Manchester on the other side of the Pennine Chain.

The cotton industry is new compared to the woollen industry. Until about 1800 wool was the universal wear in all European countries except those bordering the Mediterranean Sea. Socks and stockings as well as other garments were fashioned of wool. Cotton, silk, and linen garments were regarded as luxuries.

Britain is noted for the fine quality of its woollen goods, especially for its serges and Scotch tweeds. Because of the great need of uniforms, blankets, etc., for the armed forces the manufacture of civilian goods has been reduced to the minimum. All clothing has been rationed since the early days of the war.

Irish linen. Irish linen is famous throughout the world. Flax has been grown in Northern Ireland for centuries. There the women became skilled in weaving it into linen. At first the work was all done by hand, but, later, the workers learned to use machines. The green grass of Ireland offers a perfect bleaching ground, and the wages of the girls and women whether at home or in the factory are low. Consequently excellent linens could be sold at moderate prices. Irish linen set the standard for the best linen everywhere. Belfast was the chief linen market in the British Isles. Because of war-time conditions Irish linen goods have practically disappeared from store counters all over the world.

BRITAIN'S SOURCES OF FOOD IN PEACETIME AND IN WAR

FOOD FROM THE LAND

Outlook for agriculture. For two thousand years agriculture was the main occupation of the islands. Crops dependant upon sunshine and a long summer season suffer in Britain. There the clouds hang low, and it is cold and raw most of the time. Much of the land is rocky or swampy and is suitable only for grazing. When World War I came to an end, British agriculture was at its peak. Never-



Photo from Keystone View Company

Ricks of wheat, barley, and oats. Note the carefully thatched tops which protect the grain from rain. The most of Britain's grain is raised in eastern England where the rainfall is lighter than in the west.

theless, British farmers never could feed a population numbered in millions. For example, even in peacetime only one third of the wheat it needs to feed its people is raised in Britain; the rest must be imported. And so it is with the other staples. If all imports of foodstuffs should be interrupted for a very few days, Britons soon would be going hungry. The present war has again made it imperative for Britain to devote all possible arable land, including golf courses, parks, and lawns to the production of food. England is desperately trying now to produce one half of the foodstuffs it needs.

Because the British knew full well that the islands could not feed themselves and that many vessels bringing foodstuffs would be sunk by German U-boats, the rationing of food was one of the first precautions adopted by the authorities after the outbreak of hostilities. Allotments were first made for the armed forces. Napoleon's well-known saying that an army travels on its stomach is equally true of the war worker and the civilian. No one can work at top speed and under high tension if improperly fed. Therefore civilian rationing was necessary if the war effort was to go on at top speed. The meat and fat quotas are low but sufficient. Eggs are doled out—one a month per person. Milk is reserved for the children and invalids. All vegetables and fruits that cannot be grown at home have disappeared from the table. Tea, coffee, chocolate, sugar, and other imported luxuries are very scarce and carefully conserved.

Farm animals and animal products. During the past sixty years the trend of British agriculture was away from farming and toward



Photo from Black Star

Driving the cows home at night on the southeast coast of England. A soldier of World War II helps to guard the coast.

livestock raising. Hayfields and pastures covered about twenty times as much land as did wheat. The best regions for pasturage are in the western parts of the islands. Here is rugged country most suitable for grazing, and here are the moist winds and the heavy rainfalls necessary to produce abundance of grass. The British are experts in raising fine cattle, horses, sheep, and hogs. They have sent blooded stock to all parts of the world where really fine animals are desired. Their Guernsey and Jersey cows are celebrated for their rich milk, and their Shorthorns and Herefords for the production of beef. The slaughterhouses are not enormous plants, as in this country; on the contrary, they are small and widely scattered.

Britain surpasses all other European nations but Russia in the number of its sheep. Sheep graze in the highlands and in the eastern and drier parts of the country. Today in England sheep are raised more for lamb and mutton than for wool. Before the war the chief sources of wool for Britain's great mills were Australia, New Zealand, South Africa, India, and Argentina. London, the capital, was the greatest wool market in the world. Large quantities of the imported wool that came to London from the dominions were reexported to other nations.

Britain has about a million horses bred for riding, hunting, and

racing. Beautiful thoroughbreds contest for first place at the famous race tracks of Ascot, Epsom, and Derby.

Animals and animal products have constituted yearly about seventy per cent of the farm products in value. Nevertheless they did not supply enough food for Britain's needs. Beef was imported from Argentina and Uruguay; mutton from New Zealand and Australia; pork products from the United States, Ireland, and Denmark; and dairy products from Denmark, New Zealand, and other countries. More than half the imported cheese came from New Zealand alone. Butter, fresh cream, and milk were supplied by Eire.

The dairy outlook. The dense population of Britain creates a wide demand for dairy products. As a consequence, many British farmers are dairymen. Butter and cheese can be brought from a distance, but fresh milk must be produced nearer home. Therefore eighty per cent of the dairy farmers produce milk. As in all countries butter and cheese can be made by those who do not have ready access to large markets. The Irish farmers organized coöperative creameries which supplied large quantities of butter to the English market. The dairy center of Eire is near Dublin.

FOOD FROM THE SEA

British fisheries. The British, sometimes jokingly referred to as *beefeaters*, consume great quantities of fish as well. Kippered herring are considered a great delicacy. Cod, plaice, and sole, which also abound offshore in the cool northern waters, form an important part of the British bill of fare. The best fishing ground of the North Sea is the Dogger Bank, an extensive shoal about sixty miles east of Newcastle. There are other banks to the south, and there are shoals off the coast of the Netherlands. The fish caught there are plaice, cod, halibut, and sole. Cod, haddock, and herring are plentiful around the Shetland, Orkney, and Hebrides Islands off the Scottish coast. Scottish fishermen specialize in herring. In normal times nearly one hundred thousand people are engaged in catching, cleaning, and preparing fish for market. Grimsby, Hull, London, and Yarmouth, all coast towns, are important fishing centers. London is the largest fishing port in the world.

HOW PEACETIME BRITAIN SUPPORTS ITS PEOPLE

By selling labor and coal. The chief resource of the British Isles is the progressive people who inhabit the islands. Aside from

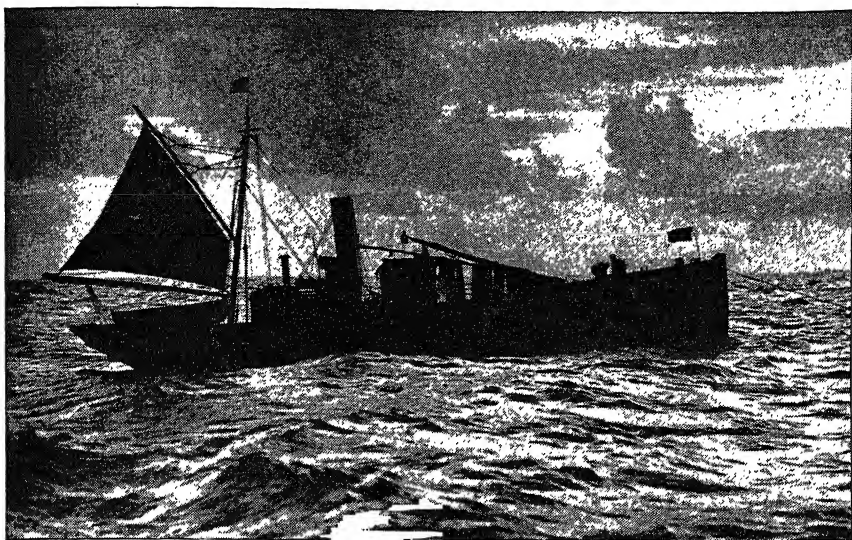


Photo from Keystone View Company

A fishing vessel in the North Sea. This trip resulted in the splendid catch of more than 100,000 herrings in three days. The North Sea is one of the best fishing grounds in the world.

that great asset the outstanding gift which nature has bestowed on the islands is the rich deposit of coal which is well distributed over the island of Great Britain. The people have used this resource very efficiently. Ever since the beginning of the industrial revolution in the middle of the eighteenth century the British have been an industrial people.

Besides manufacturing large quantities of iron and steel they have imported huge quantities of cotton and wool which they exported in the form of cotton and woolen goods. Every shipload of manufactured goods represented many days of British labor plus the power derived from British coal. We might say then that Britain has been selling labor—skilled labor—and shipping it to all parts of the world. If British coal and iron have entered into their making, the price of the coal and iron must also be considered in estimating the value of the articles manufactured for export. Thus selling skill, labor, and fuel Britain has paid its way. Not otherwise could a nation of limited natural resources support so large a population or have attained such an influence in the world's industrial life.

By the carrying trade and foreign investments. Britain had other ways of making money besides selling manufactured goods. Its merchant marine transported not only its own goods but goods shipped by the people of other nations. There was also the income

from the investment of British money in foreign enterprises, such as railroads, mines, oil wells, and plantations of various kinds. Then there are British business houses, such as banks and insurance offices, located far and near all over the world. All these activities yielded sizable profits which helped to increase the income of the British people and pay for the heavy imports.

Great Britain, the world's middleman. Many goods that were not used in that country passed through British ports. For example, tea grown in India or Ceylon was sent to England, there prepared and packed, and then sent to the United States. The tea was exported to Britain, but reexported. Such products are known as *re-exports*. British merchants imported wool from Australia to sell in the United States and on the continent of Europe; cotton sent from the United States to Liverpool was reexported in times of peace to Germany or France; rubber from the Malay Peninsula often came to the United States by way of London. Cargoes were thus obtained for British ships and profits for British merchants. Germany, France, Eire, and the United States were the chief purchasers of British re-exports.

Ships and shipbuilding. Britain is not self-sustaining; in fact, in normal times it produces only food enough to supply it for two days of each week. The rest of the food must be contributed by all parts of the world. Raw materials for British industries must be brought from afar and manufactured articles must be transported to distant markets. To meet this situation, thousands of ships are needed. Britain has had a larger number of ships carrying freight and passengers than any other country. British ships formerly carried nine-tenths of the oversea trade of the empire and one half of the oversea trade of the world.

Britain has excellent harbors on all coasts. These harbors are easily reached from the interior as no part of the British Isles is more than seventy miles from the seaboard. Some of the chief ports are London, Liverpool, Glasgow, Bristol, Plymouth, Southampton, and Belfast. Newcastle, Cardiff, and Barry in normal times are important coal-exporting ports.

Britain developed a great shipbuilding industry. In some years it held fourth place among that country's industrial activities and two hundred thousand workers were employed. There have been, however, wide fluctuations in production and employment. Glasgow is the chief shipbuilding center. Other important centers are on the Tyne and in Belfast, Northern Ireland.

GUIDES TO STUDY

1. What different names are applied to Great Britain and its possessions?
2. In what ways has British influence extended to the United States and to the rest of the world?
3. Why is the "Silver Streak" less of a safeguard than formerly?
4. With the fall of France why was England's escape a narrow one?
5. What help does Britain receive from the dominions and from the United States?
6. How has Britain adapted its industries to wartime needs?
7. Why does Britain now need ships more than ever before?
8. In what ways is Britain's location superior to that of almost any other country? What are disadvantages of its location?
9. How does the climate of the British Isles differ from that of eastern North America in the same latitude? Explain the difference.
10. How did an early start help Great Britain to become great in industry? In commerce? In colonial possessions?
11. What part has coal played in helping Britain to become great?
12. Why is coal less valuable as a resource than in former years?
13. The manufacture of textiles has for many years been Britain's leading industry. How did this come about?
14. Why is Britain particularly fortunate in having a large supply of fish near at hand? How did the fishing industry aid in the growth of the country?
15. Why are the British Isles better adapted to grazing than to the cultivation of the soil?
16. What has Britain done to meet the demands of its people for food? How has the United States helped?
17. What are the principal sources of Britain's food supply in peacetime?
18. Why should England itself produce as much of its own food and raw materials as possible?
19. What are the different ways in which Britain pays for its imported foods and raw materials?
20. How does Britain export coal and labor?
21. Why has Britain always been one of the leading shipbuilding nations?
22. How do the exports and imports of England compare with those of Argentina? Explain the differences.

TOPICS FOR CLASS DISCUSSION

1. An empire at stake.
2. Our interest in Great Britain.
3. The "Silver Streak."
4. Britain's need of help. What? Why?
5. British dominions and colonies.
6. Britain's greatest resources.
7. The industrial revolution.
8. Britain's fishing grounds.
9. Shipbuilding centers.
10. Markets for British goods.
11. English sea rovers.

WORK TO BE DONE

1. On an outline map of the world color with one color all the parts of the British Empire. Learn the value of each possession to the mother country. Which of these possessions have passed out of British control during the present war? On this map trace the shipping routes from England to all parts of the empire and to other countries with which Britain traded extensively.
2. List in order of importance what you consider Britain's principal resources. Why did you write these in this order?
3. Before the industrial revolution England exported wheat and wool and imported manufactured goods from Flanders. How does the trade of that day compare with the trade of today? Account for the differences.
4. On a map of the British Isles locate the principal industrial centers and the chief ports. Give the reasons for the growth of each. What advantages has London, the largest city in the world?
5. On your desk outline map of the world trace the principal air lines leading from Britain to other countries. Why is Britain well located to become a great aviation center? How do its world-wide possessions help? (See "The World of Tomorrow," p. 744.)
6. Study newspapers and magazines and report to the class references to British participation in the war and to events in the British Isles themselves. Note carefully, too, all reference to conferences and coöperative action between Britain and the United States.

2. SCANDINAVIA—PART SLAVE, PART FREE

NORWAY—THE LAND OF THE VIKINGS

Norway occupied. From Denmark the Germans found it easy to enter Norway. Possession of Norway gave them distinct advantages. From Narvik iron ore could be shipped to the south when Swedish ports were closed by ice, providing, of course, the ships could escape the British blockade. Then, too, Norwegian ports offer excellent bases for attack on Britain by sea or air. Norwegian fiords on which the ports of the country are located provide excellent shelters for German ships, both naval vessels and merchantmen. But German control and the British blockade have paralyzed Norwegian occupations. The country has lost control of a part of its great merchant marine, once a source of great income; its fisheries are greatly hampered; and the products of its hydroelectric plants are no longer free to enter world markets.

German-controlled Norway. The Germans have strongly fortified Norway against possible invasion by the Allies. It is thought that the country is garrisoned by more than 300,000 German troops. German control, as in all of the occupied countries, is ruthless and



Photo by James Sawders

A lumber mill in Norway. Swift streams from the highlands furnish waterpower to saw the logs into boards and planks.

cruel in the extreme. Ownership of property by the native people can hardly be said to exist. What is needed or even wanted by the Germans to further their own purposes is confiscated.

There is no religious, social, educational, or economic freedom, as we know them. All religious services are closely watched and controlled by the invaders. A German type of education is forced upon the schools. Many Norwegian teachers have rebelled and refused to follow German leadership. Shut off from the rest of the world as Norway is, it is impossible for its industries to go on in anything like their usual order. Whatever work is carried on must proceed primarily for the interests of the invaders.

How shall we study Norway? It would be unwise and unfair to assume that the people of Norway are living a normal life. The life of a country is normal when the people inhabiting it are free to make use of its resources to the best possible advantage. It is fair to

assume that before the invasion by the Germans the free Norwegian people were making perhaps the best use of the resources of the country. If given their full freedom again, we can be fairly sure that the former industries will be revived and will be followed by the same prosperity. With this thought in mind we shall study the resources of Norway and the occupations which naturally result from them.

A land of explorers. Norway and Sweden make up the Scandinavian Peninsula. Besides these two nations the term *Scandinavia* often includes another peninsula, that of Denmark.

Long ago the ancestors of the Scandinavians were a hardy, sea-loving, warlike people known as *vikings*, or *Norsemen*. They ravaged the coasts of western Europe, plundering wherever tempting goods and riches offered themselves. They were so feared that everywhere Christian people prayed to be delivered "from the fury of the Northmen." They even penetrated as far as the coast of New England. The sea at their doors was their roadway, always testing their strength and always beckoning them on to greater adventures.

An outstanding Norwegian explorer of recent times was Roald Amundsen, the discoverer of the south pole in 1911. Later in a plane named the *Norge*, the Norwegian name for the country, he with others made the first flight over the north pole. With Commander Byrd he shared the honor of having visited both poles. He was the first person to sail around the world within the Arctic circle. He was also the first person to traverse the northwest passage, a feat which numerous explorers had been attempting ever since the discovery of America.

A forbidding land. One writer has picturesquely described Norway as a country with a granite back and a fir-tree jacket. Mountains cover practically the whole of the country. The forest trees are mostly evergreen. Strong winds blowing over the many hills make the trees stunted and irregular in shape. In the gorges, where there is protection from the fierce winds, the trees grow tall and straight. Such trees are of great value in shipbuilding and other activities.

Norway is often called "the land of the midnight sun." Strictly speaking, we should apply that name only to that part of the country that lies within the Arctic circle.

The soil of the country is poor. In fact, three quarters of the land is unsuited to cultivation. The area remaining is so small that over half the farms are not more than five acres in size. Nevertheless, these small farms support more than one third of all the people. The



Photo by James Sawders

Haying time in a fertile Norwegian valley. The moist winds from the Atlantic make it difficult to dry the hay. To hasten the process the grass is placed on fence-like supports thus exposing it to sun and air.

location of Norway, so far to the north, has this advantage: eighteen or twenty hours of daylight in summer is of great help in ripening the grain crops. The mineral resources are very limited. No wonder that, in seeking a living, Norwegians turn from the land to the sea!

The inviting sea. Norway has one of the most irregular and picturesque shore lines inhabited by man. Deep narrow bays, called *fiords*, penetrate far inland, furnishing quiet waters along the entire stretch of coast. Winds from the Atlantic prevent the freezing of even the northernmost harbors. Sheltered by fir-clad mountains, these fiords, whether gloomy under lowering clouds or bright with bursts of sunshine, are always beautiful. It was easy in the early days for the Norsemen to venture forth. Numerous bordering islands were their first goal. Lumber for building more and larger ships was close at hand in the forests. Thus we see how naturally fishing and the building of ships came to be Norwegian industries, to which later was added the overseas carrying trade.

Wealth from the sea. Fishing was a main source of wealth for Norway. All the ports were fishing centers. Although Oslo is the capital and the largest city, Bergen was the leading fishing port.

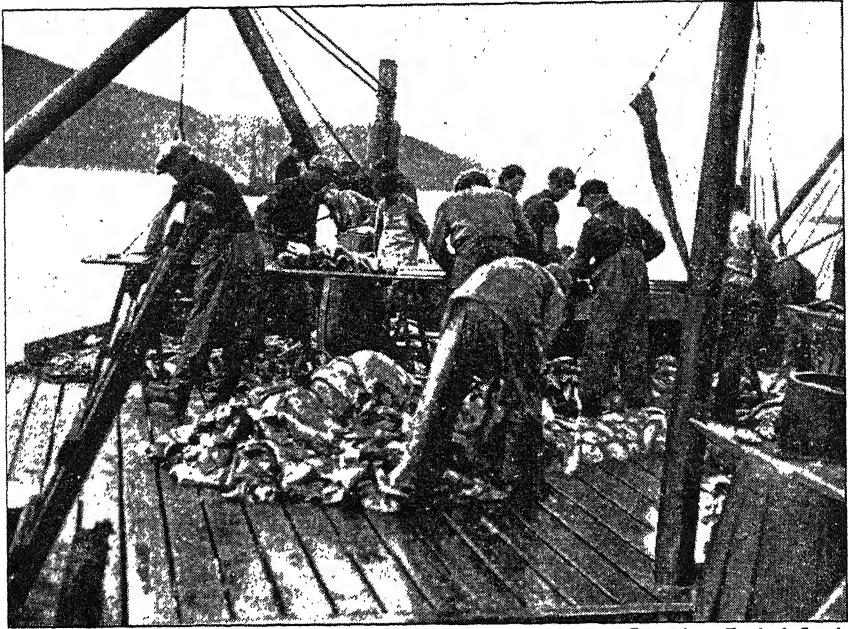


Photo by Lionel Green from Frederic Lewis

A fishing vessel in the harbor of Hammerfest, Norway, the northernmost town on the continent of Europe. The fishermen are cleaning codfish. Cod-liver oil is a product of the Norwegian fisheries.

The fishing industry was of three types: fishing for cod in the North Sea and near the Lofoten Islands; fishing for herring in the waters surrounding southern Norway; and fishing for whales in the South Atlantic and Antarctic Oceans. As a result of these extensive fisheries, Norway formerly prepared and exported enormous quantities of salted, smoked, dried, or canned fish. To the United States alone Norway sent millions of pounds of canned fish. Forest products, especially wood pulp and newsprint, were the leading exports; but fish and fish products came second.

Wealth in forests. About twenty-five per cent of the forests are hardwood; the rest are evergreen. The products of the forest are lumber, pulp, paper, wooden articles, and paper articles. Spruce in great abundance and practically unlimited water power are the factors favoring the production of wood pulp and paper in large quantities. These exports found their largest market in the United Kingdom. To the United States Norway sent newsprint and considerable pulp.

The harnessing of water power. No other country of Europe has so much water power as Norway. The western mountain slopes are abrupt and their streams have consequently swift currents with

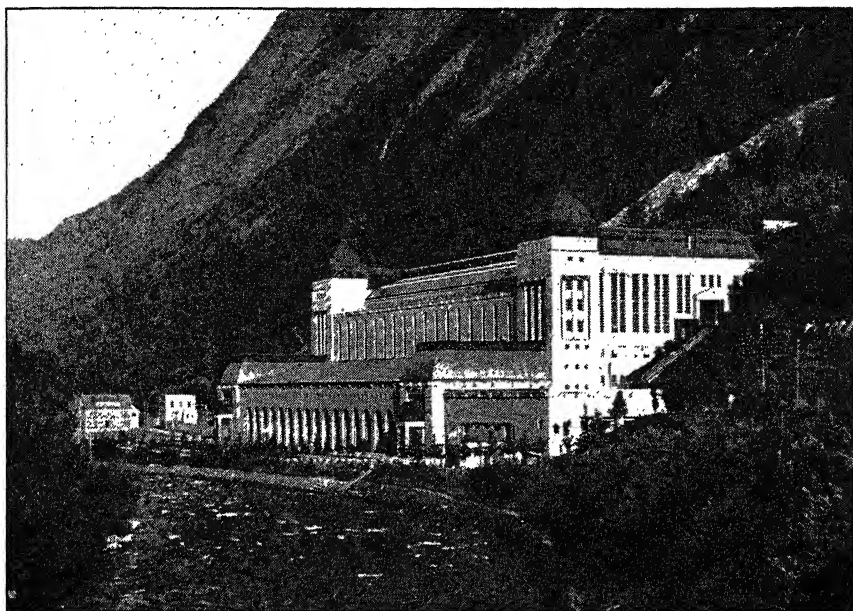


Photo by James Sawyers

An hydroelectric plant in Norway which supplies power to the town of Notodden nearly one hundred miles away. By manufacturing nitrates and aluminum Norway in peacetimes in a sense exports its waterpower.

great potentialities for power. However, up to the time of the German occupation, only one seventh of the water power was utilized. There were two important chemical industries in which hydroelectric power was employed—one was the making of nitrogen compounds to be used in manufacturing commercial fertilizers; the other, the making of aluminum.

The nitrogen for making nitrogen compounds is drawn from the air. Norway has no coal and but little iron, but it has as much atmosphere as any other country. No one can stint this raw material. The supply is limitless and instantly available for the important manufacture of nitrogen compounds.

To make aluminum, the ore for the process must be imported. Some five tons of coal are necessary to prepare each ton of ore for the electric furnaces. Unfortunately, Norway has no coal except in far-distant Svalbard; so great quantities of coal were brought from a distance. Aluminum has been, however, an important export of Norway.

Norwegian cargoes. Since Norway could not provide enough food for its people, foodstuffs had to be imported. Textiles and manufactured goods were other important items. Coal was imported

and some ores to be smelted and refined by electricity. Norway bought about equally from Great Britain and Germany.

Norway exported the products of its forests, its fisheries, and its hydroelectric plants. There is the possibility that, when it is free once more, it may sell its electric power to neighboring countries to the south. Britain, across the North Sea, was Norway's chief buyer.

Service of the merchant marine. When the population of Norway is considered, we find that its merchant marine exceeded that of any other country. It has been justly said that "the whole nation could be taken aboard its own ships." Norwegian ships not only transported their own goods, but they engaged in the carrying trade for the benefit of other nations. The Norwegian sailors, whether officers or crew, are known and approved everywhere. They still are living up to the old viking traditions of courage and daring as seamen and as saboteurs against the Nazi invaders.

It is interesting to note that steel ships engaged in trade for Norway have generally been built in neighboring coal-producing countries. To import coal for shipbuilding or to have the native coal brought from Svalbard was so costly as to be prohibitive. Because of this handicap, Norway was not able to compete with coal-producing countries in iron and steel industries.

A sturdy people. In 1940 Norway had an estimated population of less than 3,000,000—all peace-loving people. All they asked of neighboring countries and the world was that they be left alone to work out their own destiny. Having been able to maintain their neutrality in World War I, they confidently expected to be able to do so again. They had no desire to quarrel with anyone and expected no one to interfere with them. As a consequence they were wholly unprepared to cope with the sudden and complete occupation of their country by the Germans. Thousands of young men have slipped over the border into Sweden on their way to England or have risked their lives fleeing to England in small boats there to offer their services to the Norwegian government in exile. Those who must stay at home have become past masters in sabotage. They are doing everything in their power to hasten the day when they shall once again be a free people.

SWEDEN—A FREE COUNTRY

Sweden and the war. As yet Sweden has not been invaded by Germany. Apparently the only reason for this is that Germany has



Photo by James Sawders

Piles of pulpwood in a Swedish forest. Other products of these forests are lumber, matches, and charcoal. Since Sweden has no coal, much of its iron ore is smelted with charcoal.

little or nothing to gain by so doing. The surplus commodities possessed by Sweden which are needed by Germany are iron ore and forest products. So long as these products move to Germany in sufficient quantities, there is no reason for an attack on Sweden. A conquered Sweden would simply mean the tying up of thousands of German troops to police the country.

Although Sweden in a sense may be said to be independent, yet it is almost completely cut off from the rest of the world. Before the war its forest products, iron ore, and highly specialized manufactures were sent to many countries. In return for these exports Sweden depended upon foreign lands for foodstuffs, coal, petroleum products, and textiles. Inability to carry on a world-wide trade has greatly hampered all the industries of the country. The people have suffered from the lack of certain foods and many other commodities necessary for their welfare. In addition, the usual routine of economic and political life has been disturbed by the fear of the possibility of invasion. However, the country's resources are such that

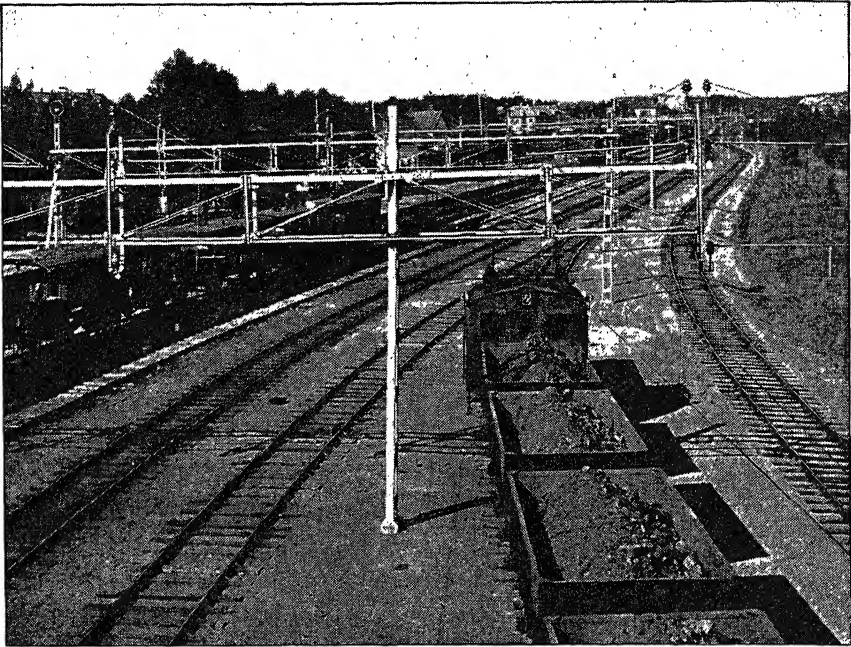


Photo by James Sawders

An electric engine drawing cars laden with iron ore from the mines of Swedish Lapland. The ore is shipped from the port of Lulea in the summer, and, when that port is frozen, it is sent by rail to Narvik, Norway, which is open all the year.

with the return of freedom of action the former industries of the country are sure to pursue their usual course. In order to understand what the future conditions will be we must know something of prewar Sweden.

Valuable natural resources. Sweden is more fortunate than Norway in several important ways. In the first place it is larger than Norway. In the second place its forests are more extensive. They cover about half the country and constitute the nation's greatest resource. In the third place Sweden's agricultural resources are much greater than those of Norway; there is not so much need to import foods. Most of the farms are in southern Sweden where the surface is not mountainous and where the growing season is longer than farther north. The value of the farm products exported was nearly one half that of the farm products imported.

Sweden is rich in iron. Its deposits of iron ore are greater than those of any other nation in Europe with the exception of those of Alsace-Lorraine. Millions of tons of iron ore were exported every year while at home large iron and steel plants give employment to thousands of workmen. Sweden is fortunate in its quarries of granite,

marble, and sandstone—all useful for building. In recent years there has been marked development in the quarrying of stone and the future for this trade seems promising.

Norway, Italy, Russia, and France are the only European countries which exceed Sweden in water-power resources. Water power runs the sawmills and planing mills which prepare lumber for home use and for export; hydroelectric power smelts iron and other ores, makes nitrates and other chemical products, and supplies power for many other manufacturing plants. However, it must be realized that, owing to the freezing of the rivers in winter, the water power is then much curtailed.

If we consider all its abundant resources, it is not surprising that in normal times the foreign commerce of Sweden is nearly twice that of Norway.

Contributions of the forests. Lumbering has been carried on in Sweden for centuries. There is nothing to prevent its being continued indefinitely as the government has excellent conservation laws. Nearly half the forests are owned by the farmers. The other half is divided almost equally between the state and the large lumber corporations. The leading purchasers of Sweden's forest products were those nations whose virgin forests were felled long ago—namely, Denmark, Britain, and Germany.

The heavy work of cutting down and trimming the trees is done in the winter. The lumbermen leave the logs piled beside the rivers so that the spring floods may carry them down stream to the sawmills. There they are fashioned into planks, mine props, and matches. Other products are pulp, paper, and charcoal. Even the sawdust is utilized, for the Swedes are remarkable for thrift. Nearly one third of the population get their living from the forests or the industries allied to them.

A safety match is one that must be rubbed against a specially prepared surface. This is a Swedish invention that was the foundation of its mammoth match industry. Money from foreign investors aided the rapid rise of the business. The Swedes invented intricate machines to perform all the necessary processes. The largest of these machines makes 40,000 boxes of matches per hour. All the match factories in Sweden produce 30,000 matches every second. Is it any wonder that the price of a box of matches is but one cent?

Rich mineral deposits. Sweden has some deposits of copper and zinc. Its greatest asset, however, is its iron. The iron mines are widely scattered; some are in the south near thickly settled

regions while others are far away in Lapland, north of the Arctic circle. The latter have the largest deposits. Since Sweden lacks coal, the smelting is done with charcoal. The result is a very fine grade of iron, much in demand abroad for making cutlery and other articles of superfine quality. Now that coal and coke are employed in smelting, Sweden no longer leads the world in the production of iron and steel. Today electricity is being used to some extent both in smelting and in making steel.

The large deposits of iron ore in Lapland cannot be smelted profitably with charcoal because they contain much phosphorus. There is nothing to do, therefore, but to export the ore to coal-producing countries. Accordingly, much was sent from the ports on the Gulf of Bothnia in the summer and from the port of Narvik in Norway in winter when the gulf ports are frozen. Sweden is far colder than Norway in winter. This is because the great mountain chain of Scandinavia cuts off the warm, westerly sea winds that keep the coast of Norway at higher winter temperatures than prevail in Sweden.

Some steel is made into machinery. Sweden is noted for the manufacture of telegraph and telephone apparatus. An important piece of dairy equipment, the cream separator, is a Swedish invention much in use at home and abroad. Such machinery is an important item in the list of Swedish exports.

Stockholm and Göteborg are the two most important cities. Stockholm is one of the finest of European capitals. Its setting amid lake, harbor, and islands is superb. Göteborg has an excellent harbor on the west coast.

DENMARK—AN ILL-TREATED NEIGHBOR

Denmark invaded. When the Germans invaded Denmark, they met no opposition; there was little bloodshed. But German soldiers are everywhere and 3000 Danes have been imprisoned for anti-German activities. The police of the country is made up of Danish citizens. Although there has been no armed opposition on the part of the Danes, they are doing much to hamper the German war program. As in the Low Countries, they have their own underground organizations. Factories are set on fire; trains are derailed; in various ways work in shipyards and factories is delayed; and strikes in German war industries are common. Like the Norwegians the Danes have become expert at sabotage.

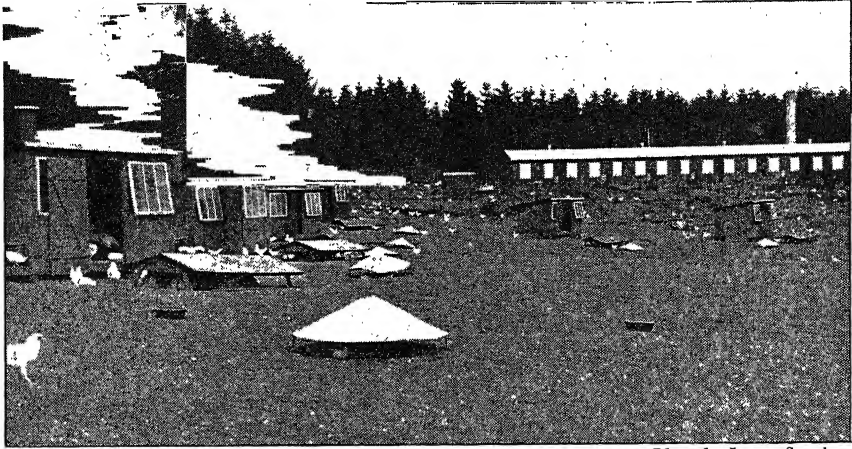


Photo by James Sawderys

A large Danish poultry farm. The Danes are experts in the poultry industry. In times of peace they find their best market in Britain.

In seizing Denmark, the Germans for a short time added considerably to their food supply. Large quantities of meats, dairy products, and eggs were available for the German army and for transport to Germany. Additional supplies of food were very acceptable to the Germans since in peacetimes much food came into the country from overseas. There was one great difficulty, however. Formerly much of the feed for Danish cattle, hogs, and poultry had come from Argentina and the United States. Oilseeds, a source of margarine and seedcake for animals, had been imported in large quantities from Africa and Asia by sea. Without these supplies it became necessary to slaughter large numbers of animals which had produced the dairy products and eggs for export as well as for home use. Even if feed could be obtained in sufficient quantities, Great Britain, Denmark's great market for the products, can no longer be reached. Danish merchant vessels were either seized by Germany or were interned in the foreign ports in which they happened to be at the time of invasion. Many of the Danish ships, as well as those of other conquered countries, are now being used by Britain and the United States to help meet the great demand for ocean transport.

LAND OF COÖPERATIVES

Specialization in animal products. Denmark has few natural resources. It has no mineral wealth, no forests, no water power. Even its soil is not very fertile. But the Danes—a sturdy, virile people—

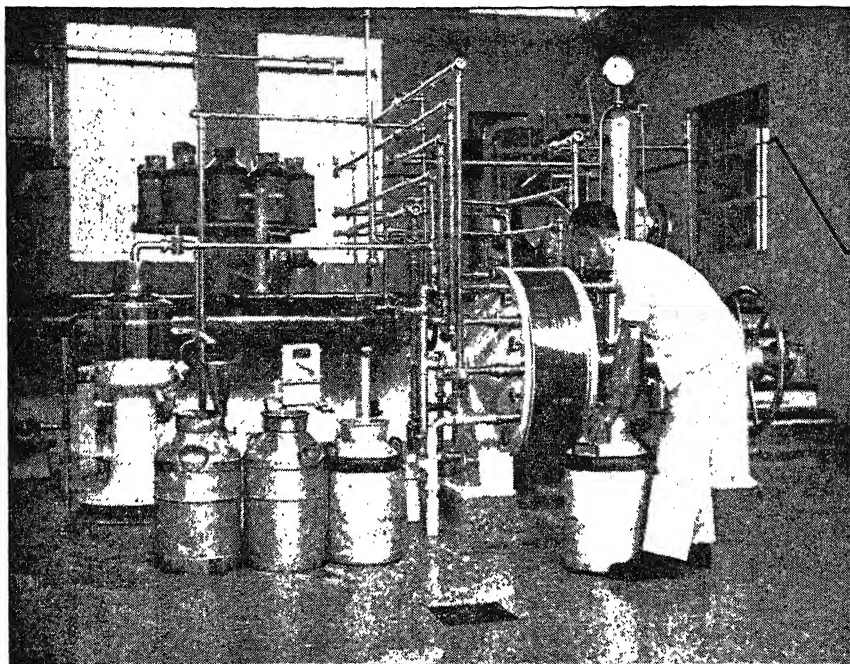


Photo by James Sawders

A Danish coöperative dairy. In this plant the cream is separated from the whole milk. The skim milk is fed to poultry and hogs. There were more than 1400 co-operative dairies in the country before German occupation. In normal times Denmark exports more butter than any other country.

have done their utmost to combat these adverse conditions. They have used commercial fertilizer to improve the land, and they have taken great pains to improve their farm animals. Before the war their wealth was mainly centered in the cow, the pig, and the hen. England's trade with Denmark was enormous, for Danish butter, bacon, and eggs were in great demand for British breakfast and tea tables.

Denmark had established coöperative associations that were exceedingly important agents in the success of the farmer. These associations bought, sorted, graded, and, if the articles warranted, stamped and marketed the farmer's products. The official stamp guaranteed approved quality, quantity, and proper conditions of cleanliness on the farm whence the products originated. Over 1000 coöperative creameries made and marketed butter; coöperative slaughterhouses killed the pigs and found a market for the bacon and pork; coöperative associations graded eggs, stamped them, and thus guaranteed their excellence. Danish butter makers have been invited to go to Canada, the Baltic states, Russia, and other foreign countries to teach the

farmers of those countries how to make and market a first-class product. There were coöperative stores in all the towns. Here the farmers bought fodder, farm machinery, fertilizers, coal, and supplies for the home. The farmers themselves managed all the coöperative associations, which were also carefully supervised by the government.

Copenhagen, the capital. Denmark is a "one-city country." This one city is Copenhagen (Köbenhavn), the capital and a leading center of world trade. Tivoli, "Europe's most famous pleasure garden," is one of the attractions of Copenhagen.

GUIDES TO STUDY

1. What had the Germans to gain by invading Norway?
2. What have been the effects of German control?
3. Why did Norway become a land of sailors and fishermen?
4. How has Norway made the best use of its resources?
5. How did the use of Norway's forests in the past differ from that of the present time?
6. How has Norway sent its water power to foreign markets?
7. How did Norway's merchant marine help to increase its imports?
8. In the days of wooden ships Norway was noted as a shipbuilding country. How did it obtain its ships in later years? Why?
9. How has fishing influenced the other industries and the commerce of Norway?
10. Why was Sweden not invaded by the German army?
11. How has the war affected Sweden?
12. What are Sweden's natural resources? Which of these are the most valuable? Why?
13. In normal times why was Sweden's foreign trade larger than Norway's?
14. Sweden has iron but no coal. Would it be better to have coal but no iron?
15. How does Sweden send its iron ore to market?
16. In what form does Sweden normally market its forest products?
17. Sweden exported forest products and iron ore; France sold skill and taste. Which would be the better off in the course of years? Why?
18. Why did the Germans occupy Denmark? What has been the attitude of the Danes toward the Germans?
19. How have Danish industries been hampered?
20. In what ways did Danish coöperative societies help in marketing farm products?

TOPICS FOR CLASS DISCUSSION

1. Life in Scandinavian countries under wartime conditions.
2. Effects of the British blockade.
3. Norwegian explorers.
4. The midnight sun.
5. Life on a Scandinavian farm.

6. Swedish inventors.
7. Scandinavians in the United States.
8. Norway's whaling.

WORK TO BE DONE

1. Draw a map of northwestern Europe which will include the Scandinavian countries and the surrounding waters. Trace the Arctic circle. Print names of countries and names of surrounding waters; also names of larger fiords. Locate accurately with a dot and print the names of the largest cities and towns including Hammerfest.
2. The harbors of Norway are never closed by ice; those of Sweden are closed for a part of the winter. Explain.
3. Make a brief report of the explorations and discoveries by Norsemen in North America.
4. Compare the resources and former exports of Norway, Sweden, and Denmark. Which do you think was using its resources so that the future would be best provided for?
5. Learn the uses made of Svalbard (Spitzbergen) in the past and its value to Norway in later years.
6. Many Scandinavians have settled in the northwestern part of the United States. What part have they played in the development of that region?

3. GERMANY—A WORLD MENACE

Germany's place among the nations. Germany did not become a united nation until the close of the war with France in 1871, and its industrial revolution did not begin much before that date. Yet its progress in science, agriculture, manufacturing, and commerce has been outstanding. It has been said that genius is an infinite capacity for taking pains. German scientists and German businessmen have studied their problems with infinite care and in solving their problems they have taught other nations valuable lessons. Germany, as compared with the United States, is not a land of great resources, but patient and thorough study has led to discoveries, inventions, and methods of work that in times of peace brought Germany prosperity and the esteem of other nations.

Older Germany made many contributions to world culture. Gutenberg, a German, is credited with the invention of the printing press and the use of movable types. Germans helped to perfect Gothic architecture which has influenced building construction the world over. German names are prominent in many fields of endeavor, as, for instance, Wagner in music, Goethe in literature, Dürer in art, and Roentgen and many others in science.

In the heart of Europe. As regards location Germany has much in its favor. It is in the north-temperate belt with its stimulating climate. Westerly winds bring rainfall from the Atlantic supplying all the moisture needed for crops. The country lies in the very heart of the leading industrial and commercial region of Europe. To the northwest is the North Sea leading directly to Great Britain and the world's most important ocean highways. On the north is the Baltic Sea giving ready access to the ports of Denmark, Finland, the Baltic States, and Russia. Land and river routes connect Germany with nearly a dozen neighboring countries. The boundaries of present-day Germany are of a temporary nature; those of tomorrow will be determined by the Allies at the peace conference. In the light of the Moscow declaration even Austria will be reestablished.

Germany before World War I. To understand present-day Germany, we must know something of its background. World War I was a major disaster for that country. Before 1914 Germany stood with Great Britain and the United States as a world leader in industry and trade. It excelled Great Britain in the production of iron and steel, machinery, electrical supplies, and chemicals. Britain surpassed it only in the output of textiles and coal. In world commerce only Britain, "the Mistress of the Seas," gained a larger revenue from its exports. In the value of its manufactured goods Germany was excelled by the United States alone. The German government had acquired extensive, though not especially valuable, colonies in Africa and had obtained a long lease of a portion of the Shantung Peninsula in China. The foothold in the East gave Germany great opportunities to develop resources and to secure trade in China.

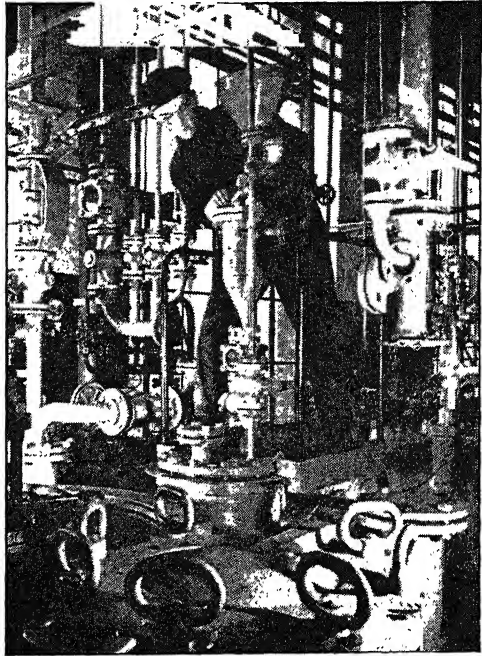


Photo by Dever from Black Star

A synthetic rubber (Buna) plant in Germany. Only a part of the process is carried on in the machines shown in the picture.

Germany after World War I. Following World War I the picture changed. Germany suffered heavy losses. It was obliged to surrender to other nations about one eighth of its territory and population in Europe. As the ceded areas contained a part of the German coal deposits and three fourths of all its iron ore, this loss was a crushing blow industrially. Alsace-Lorraine, returned to France, was the greatest loss. This province contained a large textile industry, valuable potash mines, and rich deposits of iron ore. Germany's four African colonies and a few small islands in the South Pacific were placed under the control of other nations. Its navy was almost completely destroyed, and most of its merchant marine was given to other nations to pay for the damages wrought by German submarines. All these losses weakened Germany and made the revival of its industries and trade very difficult.

Shortly after the close of the war elections were held to choose delegates to the National Assembly. When the Assembly met, it elected a president, Friedrich Ebert, and adopted a democratic constitution. The whole procedure was distasteful to the German people who had never had any experience in self-government. The radicals and communists were dissatisfied because the constitution was reactionary. The militarists and monarchists didn't like it because it was too radical—not in keeping with German tradition. Just as soon as there came a hitch in government finance or in any other phase of public life, the blame was laid on the constitution. It was held especially responsible for the acceptance of the terms of the Versailles Treaty and its odious "war-guilt clause."

When President Ebert died, the aged but popular hero, General von Hindenburg, was chosen as his successor. After serving one term of seven years he defeated his political opponent, Adolf Hitler, by a margin of 6,000,000 votes. Hindenburg, however, was getting old and public pressure was brought to bear upon him to appoint his rival as chancellor. For a time he stubbornly resisted, then yielded. That was Hitler's entering wedge. His foot was in the door. The National Socialist (Nazi) Party soon had full control. Hindenburg from that time on was merely a figurehead. Hitler became der Fuehrer (the Leader), an absolute dictator, who found the dissatisfied and disillusioned people in a frame of mind suited to listen to his grandiose plans and promises and eventually to be led by him into the greatest holocaust of war the world has ever known.

What the world fights for. The present war long since resolved itself into a contest between free peoples on the one hand and those

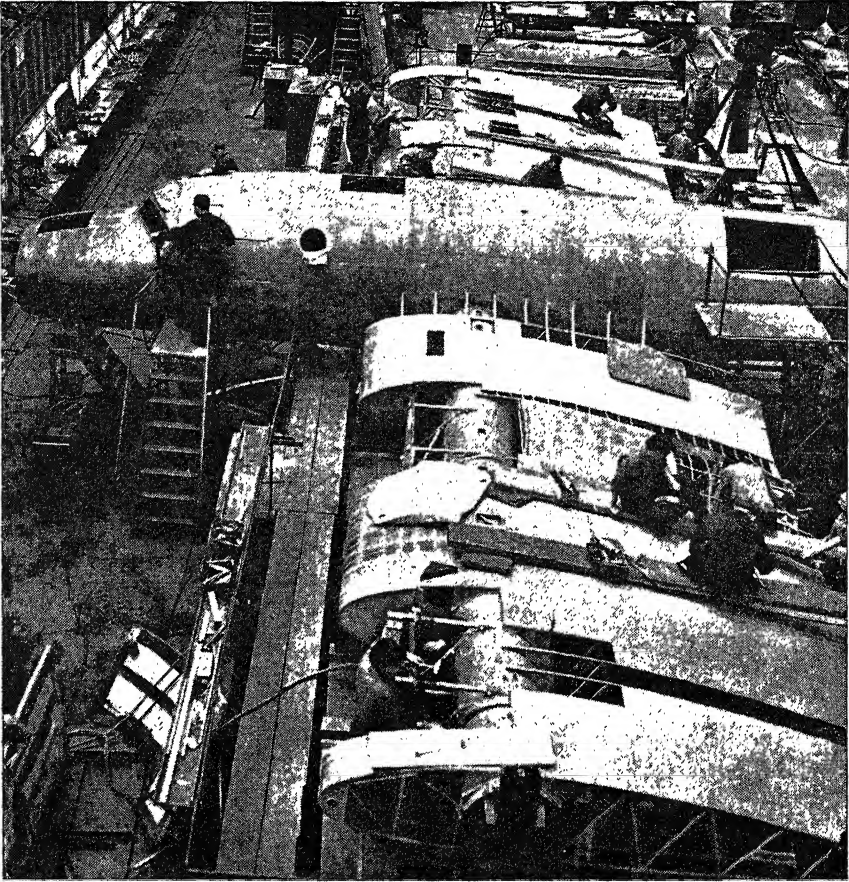


Photo by Dever from Black Star

Building a four-motored bomber in Germany. You may remember that Germany used six-motored planes in trying to defend Tunis.

led by dictators on the other. The only exception is Russia which is actually ruled by a dictator, but which is fighting Germany and is therefore counted among the Allies. On the whole, however, the ideal of the peoples of the United Nations is a democratic form of government, one in which the people decide in a large measure their own ways of living.

It is true that among the United Nations Britain, Belgium, and Norway have their kings and the Netherlands has its queen, yet all those countries have a representative form of government, that is, the people choose members of a parliament which plays a very large part in governing the country. Britain is considered to be even more democratic than the United States. It is then *freedom* that the

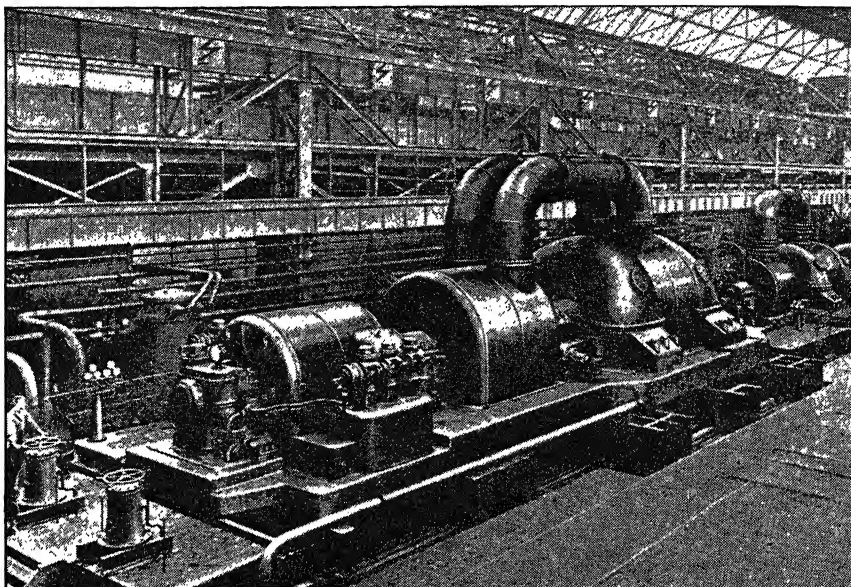


Photo by Schrage from Monkmeyer Photo Service

An electric power plant in Germany built over a soft coal mine. Coal is used to make steam which in turn supplies power to generate electricity. This method makes it possible to carry the power by wire rather than in the form of coal by train.

democratic world is fighting for. In the conquered countries there is no freedom—in the church, in the home, in the school, in the factory, or on the farm—no freedom of speech, of the press, or of the radio. Under such conditions life can hardly be said to be worth living. For these reasons the United Nations are putting forth their utmost effort to defeat Germany and the other Axis Powers associated with it.

The demands of war. World War II really began with the attack on Poland by Germany September 1, 1939. Ever since that time Germany has been almost completely cut off from the world outside continental Europe by the British blockade (p. 152). Yet from the beginning of the war up to the present time Hitler has had millions of men in his armed forces who had to be supplied with food, uniforms, and all the accoutrements of war. For peacetime needs Germany, as is true of all other countries, looked to all parts of the world for some of its foods, raw materials, and manufactured articles. It has, of course, obtained from conquered countries by confiscation many supplies which have done much to help the country. However, the German leaders have been obliged to bring to their aid all the physical resources of Germany plus scientific knowledge, skilled

labor, and persistent effort, either voluntary or enforced. It is necessary then to know the resources of the country and something of how the German people have used those resources in peace and in war. As soon as Hitler was firmly intrenched in power, all domestic resources were placed in the hands of an economic dictator, Reich Marshal Goering. He was given complete control over the production and distribution of all commodities.

THE FOUNDATIONS OF GERMANY'S STRENGTH IN PEACE AND IN WAR.

Physical resources. Germany is not rich in agricultural lands. Not much more than half of the land can be cultivated, and the soil is not especially fertile. On the sandy plains of the north the principal crops are potatoes and rye. Farther south where the land is more hilly, wheat and sugar beets are raised. The leading dairy regions are still farther south and also on the lowlands bordering the Netherlands.

Forests cover about one fourth of the country. They are scattered over areas not well suited to farming in the northern plains and in the highlands to the south. They are cared for almost as carefully as the farm crops and yield a large part of the lumber needed. In the forest areas woodworking in the homes has always been an important occupation, and articles made of wood have been exported in considerable quantities.

In the Rhine-Ruhr Valley is the greatest deposit of bituminous coal in Europe while in other parts of the country are enormous deposits of lignite. Other minerals mined in considerable quantities are copper, lead, and zinc. Germany's yield of petroleum is small. Germany is immensely wealthy in potash. It is estimated that there is enough potash in the country to supply the whole world for 2000 years. Small quantities of iron have been mined in the Ruhr Valley for many years. There are also small deposits in other parts of the country.

German chemists. Resourcefulness in chemistry has without doubt been Germany's greatest scientific, commercial, and economic asset. If Germany did not possess something greatly needed and could not readily import it German chemists managed by the use of their skill to produce from materials at hand an article as good if not better than the original. Chemists have studied the nature and needs of the soil and sought to provide the best of chemical fertilizers. They have discovered the best methods of using potassium for fer-

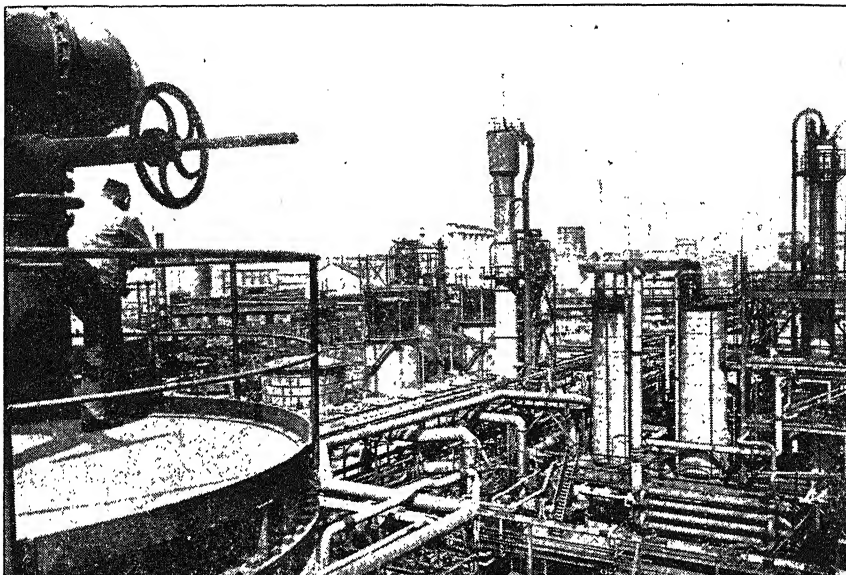


Photo by Dever from Black Star

A German plant where gasoline is obtained from coal. It would have been impossible for Germany to carry on the war as long as it has if it had not been able to obtain much of its gasoline in this way.

tilizer, and they have been leaders in extracting nitrogen from the air both for use as fertilizer and for manufacturing explosives. They have made the beet yield much more sugar than formerly. They have obtained dyes, drugs, flavors, and perfumes from coal tar and have been among the first in making and using vegetable oils. More recently German chemists have discovered a new and cheap process of manufacturing wood alcohol. They have successfully obtained gasoline from coal and are improving the processes of making rayon and plastics. They have been one of the leaders in producing rubber from new sources, and they imparted the secret of making synthetic rubber under severe restrictions.

Use of Germany's resources. How to provide food for the people is one of the foremost problems in every country. In Germany, although the soil is poor, by the wise use of fertilizers and the rotation of crops the land was made to yield a large part of the food-stuffs needed. The area of Germany is only about twice that of our state of Colorado, yet the German potato crop is nearly four times as great as that of the whole United States. The yield per acre is about double that in our country. Besides being used as food for the people, potatoes are fed to farm animals, and the surplus is used in the manufacture of starch and motor alcohol. Germany has little

petroleum; therefore, any addition to the supply of motor fuel is a real asset.

Germany was one of the first countries to promote and develop the production of sugar from the sugar beet. That is another crop that has helped solve the livestock problem as the beet tops and the pulp left after the extraction of sugar are used for cattle feed.

A large part of Germany's abundant supply of potash was formerly exported. At home it was used to fertilize the soil. The salts also furnish raw materials employed in many chemical products.

Germany has no cotton and comparatively little wool; therefore it is dependent upon other countries for the raw materials of its textile industry. A century ago home-grown wool and flax sufficed. In recent years a large part of all Germany's imports has been raw materials for its mills and factories. In an effort to meet the textile need in wartime, German chemists are facing a Herculean task; namely, to invent and perfect substitutes for all imported raw materials.

Germany's great deposits of coal are used for fuel and for generating power. A mineral oil very much like petroleum is extracted from its abundant supply of lignite. More than one tenth of the coal mined was exported to neighboring countries. Although Germany had only a limited quantity of iron, by importing iron ore from Sweden, France, and Spain it carried on an extensive manufacture of iron and steel goods.

The Rhine-Ruhr Valley. Germany's large deposits of coal in the Rhine-Ruhr Valley, together with the near-by deposits of iron ore, have been the cause of the establishment there of one of the most widely known iron and steel centers in the world. Over three quarters of all the iron and steel output of Germany came from this region. Small local deposits of iron ore started the industry which was continued with imports and with ores brought from other sections of the country. There were built great synthetic rubber works. In this valley are located forty or more cities and towns all engaged in the maddest armament race of all time. One of the best-known cities is Essen, the home of the Krupp works. The plant, noted for its big guns, was founded in the year 1800. In repeatedly bombing Ruhr cities the Allies are striking at the very heart of Germany's war industries.

In addition to the manufacture of guns and ammunition, Germany, with the idea of making itself invincible, manufactured armored tanks; bomber, fighter, and transport planes; gliders; and

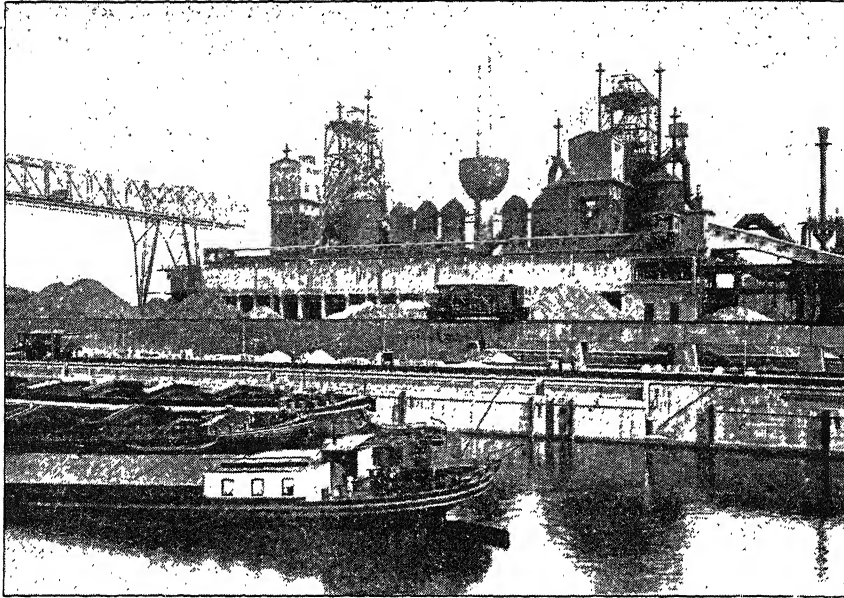


Photo from Monkmeyer Photo Service

A part of the Krupp steel plant at Essen, Germany. It is located near the country's largest coal fields. Here are made many of Germany's big guns and other munitions of war. This plant may have been destroyed by bombing.

submarines in uncomputed numbers. Battleships, raiders, destroyers, minelayers, and other types of surface vessels were also built to carry the war to the high seas.

Unlike the allied nations who waited until the war broke out before they got into high gear, Germany had been working and living on a war basis for eight years or more. While its war industries, as we have seen, are centered chiefly in the Ruhr Valley, they were safely beyond the range of allied bombers for several years. As the various countries have been occupied one by one, the wealth and resources of each has been confiscated. Stocks of foodstuffs, clothing, household supplies, in fact anything and everything of value that was movable or could be detached was shipped to the fatherland. The appropriation of those resources not its own tided Germany over for a time, but no lasting national economy can be maintained on such a foundation. It must in the end fall as a result of its underlying weakness.

Established industries, such as airplane factories, munitions plants, and machine shops which could not be moved, have been taken over and operated by the Germans for Germany's benefit. Although in many instances production has been retarded by slowdowns or

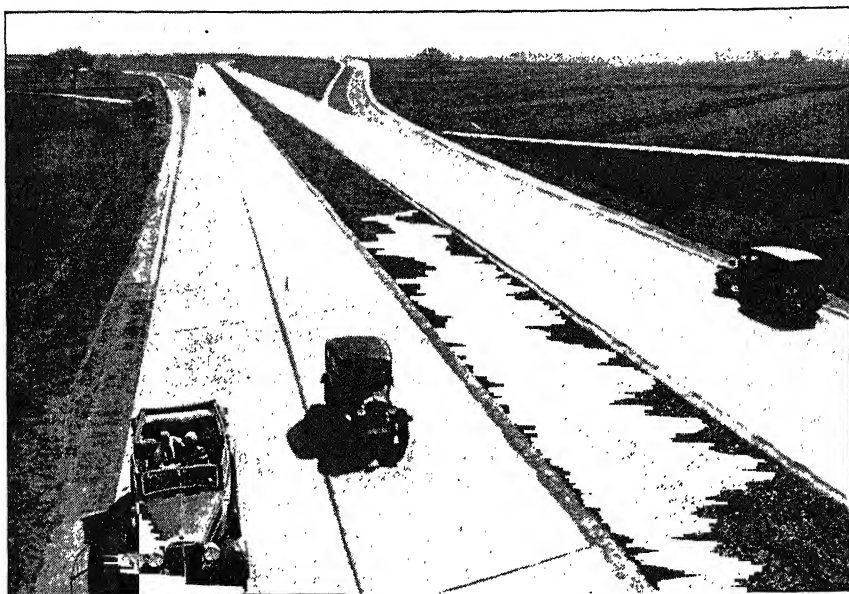


Photo by Wolff from Black Star

Automobile roads in Germany. These roads were built with the idea of moving German war equipment across country as rapidly as possible.

sabotage, the production of those plants did substantially increase its total output. One great advantage to Germany that offset the slowdown has been the spreading out of its area of production and consequently greater safety from the crippling effects of allied bombing.

Means of transportation. Germany has many means of communication and transportation. Rivers, canals, railways, and high-roads spread a close network over the country. Remote villages are linked with important cities and thus coöperation is secured.

Germany has more than 5500 miles of inland waterways. The Rhine, Weser, Elbe, and Oder are navigable rivers. Millions of dollars have been spent to make the Rhine which runs through a region of great mineral, industrial, and agricultural wealth, the important water highway that it is today. Rotterdam near the mouth of the Rhine in the Netherlands got the bulk of the Rhine traffic. The Rhine has been of great value to Germany as a tourist attraction.

Canals link the German rivers one with another and with the Seine, the Vistula, and the Danube. The Kiel Canal is cut from the North Sea to Kiel on the Baltic Sea. By its use vessels avoid the loss of time required for the detour around Jutland. In a normal year two thirds as much tonnage passed through the Kiel Canal as through

our Panama Canal. More than half the vessels going through were foreign.

Germany has over 40,000 miles of railways. In equipment and management they were unexcelled by the railways of any other country. The railways transport four times as much freight as do the rivers and canals. Nearly all lines are owned or supervised by the government which assures coöperation rather than competition with the waterways. The roads, too, are excellent and are constantly being improved and extended. These highways are controlled by the government. Private automobiles were required to pay tolls. Before World War II Germany had more air traffic, in proportion to its size, than any other country. There was an airport in every large town. Through these it had air connections with all parts of the world.

In preparation for the conquest of Europe superhighways with several lanes were built across Germany to expedite the moving of *panzer*, or motorized, divisions to the countries they intended to occupy. These roads have made it possible to shift armed forces from border to border in very quick time.

Ports of Germany. Before it was destroyed by bombings, Hamburg was the chief port. Bremen ranked second in importance. *Hamburg* had an especially favorable location, for the Elbe River on which it is located is navigable across Germany and into Czechoslovakia. Both these ports were easily accessible from the Rhine-Ruhr region, which has been the chief industrial center of Germany. *Bremen* was the leading city on the continent in importing (in normal times) American cotton, rice, and tobacco. *Stettin*, near the mouth of the Oder River, is Germany's main Baltic port. It serves as a port for Berlin, the capital, with which it is linked by canal and river. Stettin, like all the Baltic ports, has been seriously handicapped in trade by the freezing of the Baltic Sea in winter. Its tonnage in normal times was only one ninth that of Hamburg, which was nearer the North Sea and the great routes of trade. *Kiel* is located at the eastern end of the Kiel Canal. Shipyards where vigorous work is maintained may be found in all these ports. *Vienna* (Wien) is a river port, but it owes its high standing to other influences as well as its location on the Danube. In the past Vienna was industrially, commercially, and politically one of the leading cities of Europe. It was the capital and trade center of the old Austro-Hungarian Empire and the center of exchange of the products of agricultural Hungary and industrial Austria. It had extensive textile mills, chemical plants, and metal industries. It was also important for the manufacture of technical and musical instruments. It has long been known as a center of

fashion and refinement and is the seat of one of the famous European universities. The division of the old empire left Vienna stripped of nearly all its old resources and trade relations. Its old physical environment, however, remains. It lies in the path of great land routes; it is on the Danube between regions, on the one hand, rich in agricultural resources and, on the other, with highly developed industries. What its new relationship as a German city will bring to Vienna only time can tell. *Berlin*, the capital and largest city of Germany, is connected by canals with the Elbe and Oder Rivers. Much of its foreign trade formerly was carried on through the port of Stettin. It is an important distributing center for overland trade with countries to the east and south. Berlin is also a manufacturing city. Among its industries are plants producing metal products, including machinery and railway equipment, electrical supplies, textiles, and a variety of small wares. Many of these plants have been converted to ordnance and munitions plants to supply Hitler's war machine. They have all been bombed relentlessly.

GUIDES TO STUDY

1. What has the rest of the world gained by contact with German life and work?
2. What was Germany's place among the nations before World War I?
3. What losses did Germany suffer as a result of World War I?
4. What difficulties did the Germans have in establishing a satisfactory form of government after World War I? Why?
5. What conditions made it possible for Hitler to gain complete control of the government?
6. Hitler, as leader of Germany and the most influential figure among all the Axis Powers, is compelling the world as a whole to fight for what?
7. How has it been possible for Hitler to obtain the vast quantity of supplies needed to carry on the war?
8. How have German chemists aided in their country's agricultural and industrial development?
9. Why was the Rhine-Ruhr Valley the most densely settled part of Germany and the source of its most essential war supplies? Why has this region been repeatedly bombed by the Allies?
10. What preparations for war had Germany long been making?
11. How do the Germans put their coal and lignite to the best uses?
12. Why are the potash deposits of Stassfurt one of the country's greatest resources? Where are there other deposits of potash?
13. How has Germany been able to supply its people and its armies with food?
14. How does the country obtain the raw materials not produced within the country?
15. What are Germany's sources of petroleum?

16. How has Germany developed its transportation facilities?
17. What are the leading cities of the country and what is the importance of each?
18. How does agriculture aid manufacturing and commerce?
19. Why is it necessary for Germany to trade with other countries?

TOPICS FOR CLASS DISCUSSION

1. Why Germany wages war.
2. Germany's losses after World War I.
3. Europe under German control.
4. How Germany has been able to carry on the war for years.
5. Germany's greatest resources.
6. Germany's submarine warfare.
7. War in the air—German planes and Allied planes.
8. Underground movements against Germany in the conquered countries.
9. The German army in Italy.
10. The eastern battle front.
11. Ersatz products.
12. Germany's transportation.

WORK TO BE DONE

1. Tanganyika, South-West Africa, Togo, and Cameroon were former German possessions. How valuable were these possessions to Germany? (See *World Almanac* and consult encyclopedias.)
2. What great resources were lost when Alsace-Lorraine was ceded to France after World War I?
3. What has Germany gained from the countries which its armies have overrun? What could it hope to gain from those countries in the future?
4. How has German science helped the country to be less dependent on other nations?
5. Germany tried to make itself self-sustaining. In what way was this wise? In what ways was it unwise?
6. Make a study of Nazism. List your reasons for thinking it inferior to Democracy.
7. Contrast the conditions of individuals in Germany today with that of American citizens.

4. BELGIUM AND THE NETHERLANDS—OCCUPIED BUT NOT CONQUERED

BELGIUM

Through Belgium. Adolf Hitler had much to gain by extending his control over Belgium. If left free, it offered, as did the Netherlands, a possible base for the approach of enemy ships and the landing

of enemy troops upon the continent. As in the case of the Netherlands, it also provided territory and ports from which German attacks could more readily be made on the British Isles. Moreover, the heavily fortified French line of defense, the Maginot Line, did not extend entirely along the Belgian border to the English Channel. Hence, the route through Belgium was the easiest way to enter France.

Belgium was seriously affected by loss of its independence and by the British blockade. In normal times Antwerp is one of the leading commercial cities of the world. As a port it served not only Belgium itself but Germany and Switzerland as well. The capture of this most desirable river port in 1944 by the Allies greatly shortened the route of supplies to the western front. Belgium is one of the most densely settled countries of the world and relies on its foreign trade to support its large population. Hence, the loss of this trade was a very serious one.

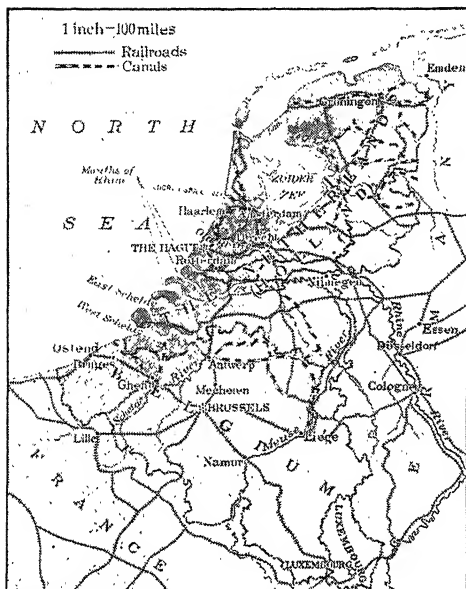
The country suffered another loss in not being able to control its manufactures. These passed into German hands and were used to further Germany's war aims rather than to bring gain to the Belgian people. For centuries Belgium has not been able to raise enough food for its people. The country has sold its labor in the form of manufactured goods to get food and raw materials. Soon after the occupation by German troops the people began to suffer for need of the actual necessities of life.

The Belgians fought gallantly until German airpower and German numbers compelled them to submit. King Leopold is a prisoner, where is not known. Before the surrender, however, the Belgian cabinet went to France and from London directed colonial affairs and carried on the war as one of the United Nations. Many Belgian soldiers fought with the British army and Belgian ships carried supplies for the Allies.

The Belgians remaining within the country resisted. Scores of underground organizations did all they could to offset German efforts to pacify the country. By torches and secret codes they guided British fliers on their bombing flights. More than fifty underground newspapers were printed and secretly circulated by Belgian patriots whose fate if caught would be death.

BELGIUM—BEFORE INVASION

"The workshop of Europe." Until overrun by the Germans in 1940 this little kingdom was a very beehive of industry. Because of



The Low Countries showing the reclamation in the Zuider Zee

its intensive farming and its many specialized manufactures, it supported more people to the square mile than any other nation in the world. Its situation in Europe is most advantageous as it borders upon three important industrial and commercial countries. Belgium indeed may be considered a part of that great industrial region that includes northern France and the Rhine-Ruhr section. Furthermore it lies on the great trade routes between the Atlantic and the important cities of central Europe. As a consequence much wealth accrued to the little country through this transit trade.

The textile industry. For centuries Flanders was noted for its skillful spinners and weavers. During the Middle Ages "all the world was clothed with English wool wrought in Flanders." This art the Flemings, or natives of Flanders, taught to the English. Hundreds of years later the British repaid their debt by teaching the Flemish weavers to make and to use new textile machines that had been invented in England. Belgium was a part of Flanders. Consequently we should expect great skill in the making of textiles. Brussels (Bruxelles) was famous for its carpets; Liège and Verviers were noted for their woolen goods. The exquisite cotton, linen, woolen, and silk goods formerly made in Belgium are the result of the wonderful skill developed through centuries of effort in this direction. The country was also famous for its beautiful handmade lace. Fabrics and fine-spun yarns were among its chief exports.

Belgium's preëminence in the making of textiles is due to three reasons: first, the skill of the workers; second, its own abundant supply of coal and that from the near-by mines of Britain and Germany; and third, its nearness to the necessary raw materials, markets, and trade routes.

Expert metal workers. The leading exports of Belgium were



Photo by James Sawyers

View along the canal in Brussels, Belgium. The large building to the left is the Chamber of Commerce Building. Brussels has been noted not so much for its commerce as for the manufacture of fine textiles, laces, and leather goods.

the products of the iron and steel industry. Iron ore was easily procured from the mines of Lorraine and Luxemburg; the necessary coal is close at hand. The skilled workmen produced not only most of the machinery needed in their own mills but also large amounts were exported. Locomotives, munitions, steel rails, and a great variety of steel articles were made. All the steel products were of superlative quality and, as the cost of labor was comparatively low, Belgian manufacturers could readily compete with their rivals in other countries. Liège was a center of this industry.

Miscellaneous manufactures. The southeastern part of Belgium was the center of the important art of glassmaking. Coal and sand, both essential for this manufacture, are here in abundance. Plate glass of the finest quality was an important export. Pottery, fertilizers, and other chemical products were important manufactures.

Small farms—large crops. Farming is an important industry because much food is needed for the many workers in Belgium. The land is intensively cultivated. Besides grains, potatoes, and sugar beets a small amount of raw material, such as flax, is raised. This flax is of a very fine grade, and much was formerly exported to

northern Ireland for its linen industry. Belgium used to import from Russia flax of an inferior quality to use in its own linen factories. No other nation raises so much wheat per acre.

Facilities for trade. Rivers, canals, and railroads thread the country in all directions and connect it with the outside world. The Scheldt and the Meuse Rivers give easy access to the sea. There are many canals in the lowlands of the west. As for railways, Belgium surpasses every other country in its miles of railroad to the square mile.

Antwerp (Antwerpen—the name means “on the wharf”), near the mouth of the Scheldt River, is a great world port, and much of Belgium’s foreign trade formerly centered there. As we should expect in a country so highly industrialized, its exports have been manufactured goods while its imports were foods and raw materials. To the United States Belgium sent fine cotton goods and precious stones. It imported in return automobiles, wheat, raw cotton, and petroleum products.

Belgium’s African colony—the Belgian Congo. Hundreds of miles to the South in Africa is Belgium’s one great colony. Palm nuts, palm oil, cotton, coffee, rice, and cocoa are raised there. The mines yield copper, tin, diamonds, and gold. Ivory has been one of the many valuable exports. Naturally the greater part of the Congo trade was with the mother country.

PREWAR HOLLAND

A valiant people. One of the reasons why the Dutch nation is powerful is the people themselves. They are fighters and conquerors. Always they have fought the sea and, because of the nature of their country, the fight must be eternal. Rivers, too, at times become enemies. “God created the world, but the Dutch made the Netherlands” is a well-known Dutch saying. These valiant people have pushed back the sea and secured the reclaimed land by dikes; they have dealt with the shoals and the sand bars that the rivers are constantly building; and they were still draining the waters of the Zuider Zee when the Germans came.

“That beats the Dutch.” Alien nations have sought to rule the country; but the inhabitants have always met invading armies fiercely and, in times of dire stress, before the days of air warfare cut the dikes, calling the sea in to overwhelm their enemies. Their contest for the oversea carrying trade was yet another struggle. In

the seventeenth century they were the most important commercial nation in the world. They had a monopoly of the carrying trade and a strong navy to defend it. Their great rival was England. In times of great commercial competition whenever an English merchant had scored an unusual success he was likely to exclaim, "That beats the Dutch." Thus originated a common expression. After a great naval victory a Dutch admiral fastened a broom to the masthead of his ship and boastfully sailed along the British coast to show that he had swept all British ships from the English Channel.

Notwithstanding these facts the inhabitants of the Netherlands are a peaceful people. They do not wish to conquer foreign territory, but rather to maintain and develop the welfare of their nation within its own borders. Because of their tolerance and great love of civil liberty their country has often become a haven for refugees from other lands. The Pilgrim Fathers, persecuted in England, sojourned there for several years before they sailed for our shores. During World War I many Germans sought refuge there. They were followed by their Kaiser who fled across the border when he realized his army faced defeat. He was allowed to live out his days there. The only event to mar the tranquillity of his long stay was the cowardly invasion by his own countrymen who overran the country at the beginning of World War II. Some of the Dutch scholars and artists rank among the greatest of all time and have made important contributions in their respective fields of work.

A fortunate location. What is the secret of so small a nation being so important commercially? Its resources are limited, and it

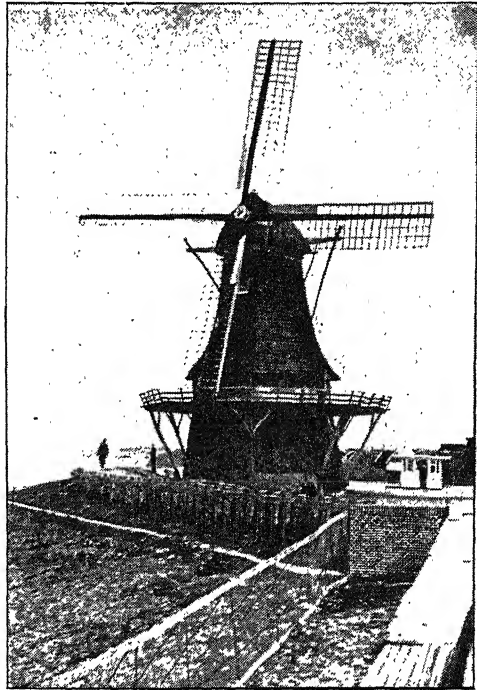


Photo by James Sawyers

Dutch windmill on the top of a dike. Running along on the top of the dike is a road. This dike is a part of the Zuyder Zee reclamation project.



Photo by James Sawders

A scene in the Dutch City of Alkmaar, known as the "Cheese City." Cheese was one of the leading exports of the Netherlands.

has but little mineral and agricultural wealth. Even the cobblestones of the streets and the wooden piles of its wharves must be brought from other countries. The answer is its location and its nearness to Great Britain, France, and Germany, the leading commercial countries in Europe. It is situated on the North Sea and is crossed by the River Rhine whose headwaters reach far into central Europe. The Netherlands is practically at the crossroads of trade. The ships of the great ocean lines came to its ports. Goods from Germany and Switzerland came by railroad or down the Rhine into the Netherlands to be shipped overseas. Two other rivers aiding this trade are the Scheldt and the Maas (Meuse).

Wealth in colonies. The Dutch have ever been famous navigators and have made many notable explorations and discoveries. In the latter part of the sixteenth century William Barents, a Dutch navigator, in search of a northeast passage to India, reached Svalbard and Novaya Zemlya. A little later Henry Hudson in a Dutch ship discovered Hudson Bay and the Hudson River and gave the Dutch a claim to New Amsterdam. Later New Amsterdam was traded to the British for Surinam, or Dutch Guiana. About the same time the

Dutch gained control of valuable lands in the East Indies which are now in the hands of the Japanese. Through the Dutch East India Company they carried on a most valuable trade with the East which brought the country much wealth and great prestige.

Former trade of the Netherlands. Notwithstanding its intensive farming the country cannot raise sufficient food for its people. From the United States came wheat and flour. It also imported manufactured articles of various kinds. To other lands the Netherlands sent vegetables, flower bulbs, butter, cheese, and condensed milk.

Agriculture that paid. After commerce agriculture is the chief occupation of the people. Much of the land is low but, thanks to the silt brought down by the rivers and the clays deposited by the ocean, the resulting soil is excellent both for crops and for pasturage. About one third of the country is below sea level, and much of the remainder is but little higher. Dikes to prevent the sea from flooding the lowlands are at all times most carefully maintained. Picturesque windmills, which once pumped water from the low land to the canals, have largely been superseded by steam pumps. The chief crops are oats, rye, flax, potatoes, and sugar beets.

The low, moist lands grow fine grass which feeds the cows in the open for half the year. The remaining six months they are housed in scrupulously clean barns and sheds. Butter and cheese from the Netherlands are famous throughout the world, and these articles with condensed milk were widely exported to surrounding industrial countries—to Great Britain, Germany, France, and Belgium. Dairying, as you see, is the chief industry of the country regions.

Another unusual activity is bulb culture for which the Netherlands has been famous for centuries. Hyacinths, tulips, and other



Photo from Keystone View Co.

Tapping a rubber tree in the Netherlands Indies. These islands were one of the chief sources of natural rubber.

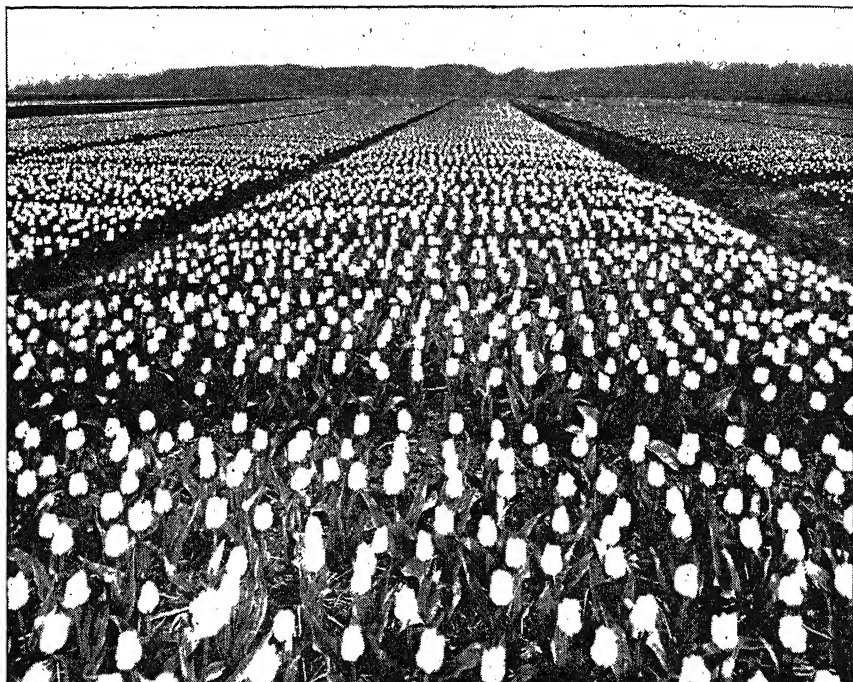


Photo by J. Jay Hirz from Frederick Lewis

A field of tulips in Haarlem, the Netherlands. Dutch tulips are known the world over; in peacetimes the bulbs are shipped to all countries.

flower bulbs cover with their lovely blooms wide areas in the spring-time. Every ten years special efforts were made to attract from all corners of the world visiting garden clubs and flower lovers "for to admire and for to see." Many tourists have crossed the ocean especially for this brilliant sight, and millions of bulbs were exported.

Diamond cutting and other industries. With little coal and other mineral supplies, the Netherlands cannot compete with its neighbors in general industry. Diamond cutting has long been centered in Amsterdam. The industry was developed there by Jewish refugees who could possess nothing but hidden wealth. These much coveted stones from South Africa and the Belgian Congo were cut and polished in many establishments giving employment to thousands of workmen. Since the Low Countries were overcome by Hitler the diamond-cutting industry has been moved to New York City. Here, where the largest diamond market exists, the industry is being carried on in part by those who learned the art of cutting in the Netherlands.

Delft chinaware was a famous product of the potteries. The re-

fining of sugar, the manufacture of margarine, and shipbuilding were other important industries.

The Netherlands invaded but not conquered. After Norway the next country to feel the effects of German aggression was the Netherlands. Holland was small, no match in armed strength for the Nazi hordes. In a few days the country was overrun, and the great city of Rotterdam was bombed into ruins. Queen Wilhelmina escaped with her government to London. The Dutch will fight on for their homeland and their island possessions in the South Pacific no matter how costly or how long the struggle.

Holland had attained a high degree of civilization and culture. It provided education for all its people. Seven Nobel prizes had gone to Nederlanders. The country had free speech, a free press, and religious freedom.

As in the case of Norway, Dutch ports make excellent starting points for attack on England by airplane or ship. From the Netherlands, too, quantities of food were shipped to Germany with little regard for the need of the Dutch themselves. Gradually the resources of the Netherlands were made to serve the purposes of the invaders.

The effects of war conditions upon the Dutch people are readily seen. The country is mainly commercial, lying as it does between the great Atlantic trade routes and the industrial areas of western Europe. The blockade put an end to trade with the outside world. No longer did the country profit from its gains as a middleman. Its dairy industry was hurt in much the same way as that of Denmark. Tulips and other bulbs, since they cannot be exported, were ground up for cattle feed. A few choice specimens have been smuggled out of the country to America, where they are being cultivated in trust until that day when Holland can once again carry on its prized industry.

GUIDES TO STUDY

1. How did the occupation of Belgium help to further Hitler's plans for attacking Britain and the conquest of France?
2. How has Belgium suffered from German domination and the British blockade?
3. How do the Belgians still carry on?
4. How did Belgium support its dense population before the war?
5. How have the textile industries of Britain and Flanders been related through the centuries?
6. What advantages has Belgium for manufacturing and trade?
7. In what ways was the Belgian Congo of benefit to Belgium?

8. How have the people of the Netherlands made their influence felt in world affairs?
9. How do you explain the fact that the Netherlands was one of the leading countries in the value of its commerce?
10. In what ways did the foreign possessions of the Netherlands aid that country's industries and trade?
11. How do the low, moist lands affect the country's agriculture?
12. Explain the former importance of the diamond industry in the Netherlands and Belgium.
13. What advantages have the ports of the Netherlands for foreign trade?
14. What advantages did Hitler gain by occupying the Netherlands?
15. What effect has German occupation had upon the Dutch people and their industries?

TOPICS FOR CLASS DISCUSSION

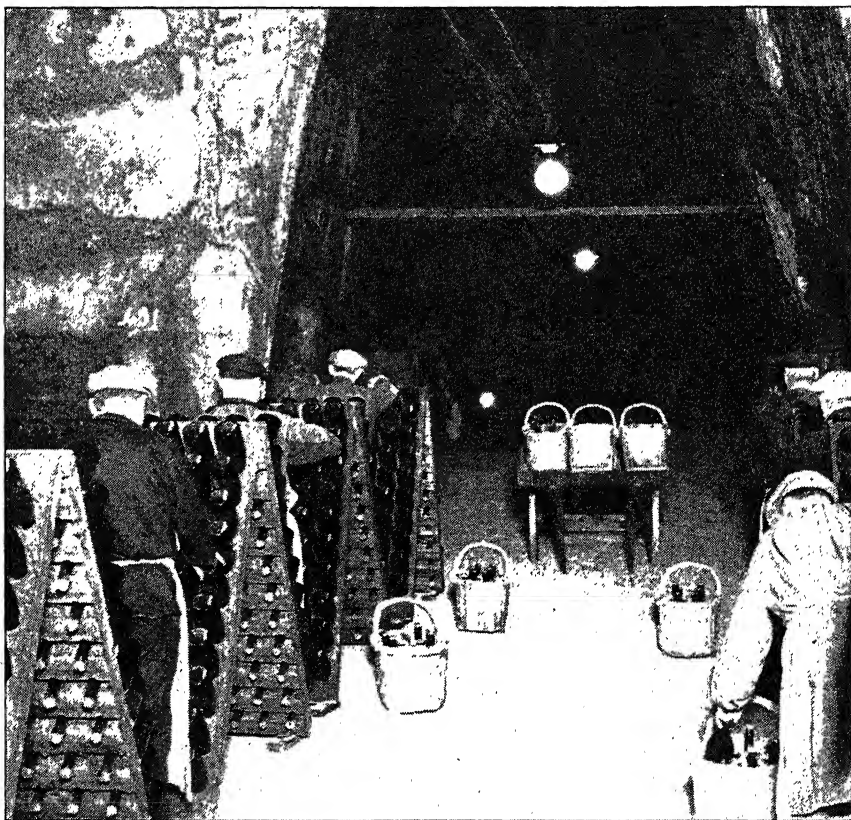
1. The Germans in Belgium.
2. Flanders and early Flemish industries.
3. Belgium exports labor and skill.
4. The Belgian Congo.
5. The progressive Dutch.
6. Dutch explorations and settlements in North America, the Caribbean, and the Far East.
7. The queen of the Netherlands.
8. The diamond industry in Belgium and the Netherlands. (See Union of South Africa, p. 726.)
9. The River Rhine in the Netherlands.

WORK TO BE DONE

1. Make a study of the Netherlands as a haven for refugees, such as the Pilgrims, the Huguenots, the Jews, and even Kaiser Wilhelm.
2. Study and make a report on "Reclamation of Land from the Sea by the Dutch."
3. On a desk outline map of Europe trace the great routes of trade which pass near or through these two countries.
4. On a map of the world locate all the possessions of each of these two countries. Trace routes which the products of those lands formerly took to world markets.
5. Make a special study of the leading cities of Belgium and the Netherlands with especial emphasis on their industries and trade.
6. Study newspapers and magazines to learn what is now going on in these countries and the heroic struggle being made by the Belgians and the Dutch to regain their freedom.

5. FRANCE—GERMANY'S TRADITIONAL ENEMY

A VICTIM OF HITLER

*Photo by James Sawyers*

A wine cellar in Rheims, France. The champagne is stored in cool cellars until fermentation is completed.

France falls. Having conquered Belgium, the German forces moved southward and in a few weeks compelled the French to ask for terms. The terms of the armistice provided that northern and western France known as *Occupied France* should be wholly under the control of the Germans. The southern portion of the country which according to the armistice was supposed to be independent was known as *Unoccupied France*. Because Paris was included in the occupied territory, the French government was removed to Vichy in the unoccupied territory. The French government was then referred to as the *Vichy government*. Still another French "govern-

ment," representing those not in sympathy with the Vichy government, was known as the "Free French Force" and had as its leader General Charles de Gaulle, who had headquarters in London. The authority of the French Committee of National Liberation was also entrusted to the hands of General de Gaulle with headquarters in Algiers and afterward, when France was partially liberated, Paris again became the seat of government. This new French government has been recognized by the Allies.

When the French armies had been defeated, it would have been easy for the Germans at that time to seize control of the whole of France. But there were reasons why it was not wise for them to do this. The French fleet and the French colonies had not been conquered. Had a Vichy government not been maintained, the French fleet would have been free to join the British in enforcing the blockade of German-occupied territories, and the French armies in Africa and the Near East would have been free to ally themselves with Germany's enemies. Furthermore, neutral countries including the United States would not have recognized the claim of any country other than France to French colonies. Especially would they have refused to recognize a German or Italian claim.

Effects of French defeat. With the defeat of the Axis armies in North Africa the German forces entered "Unoccupied France" for the purpose of preventing the invasion by the Allies of the continent through southern France. The presence of German troops also prevented the French of that region from coming to the assistance of the Allies. France was then shut off from other countries completely. Its foreign trade was reduced to zero. Although its people were greatly in need of food and other necessities, very little was permitted to enter for fear it might be diverted to the enemies of Britain. France has never been self-sufficient. It has been dependent upon foreign markets for the sale of the products to which the French have devoted much skilled workmanship and fine taste. It has also relied upon outside sources for coal and petroleum as well as for a considerable portion of its food supply. Like the other countries of western and southern Europe France has received large sums from tourists from nearly all parts of the world. Since the very beginning of the war all European countries have been closed to visitors and have therefore been deprived of all benefits of the tourist trade. Much of the income from this source had been gained from our own countrymen.



Photo by James Sawders

Threshing wheat in northern France. Although France has an area less than that of Texas, its normal wheat crop is from one third to one half that of the United States.

RESOURCES AND OCCUPATIONS OF PREWAR FRANCE

French farming. There are several reasons for the great importance of farming in France. The first is the fact that nearly 60 per cent of the total area is under cultivation. The great central plain of Europe extends across northern and southwestern France and gives the country a vast area of fertile farm land. A large part of the central plateau is also suitable for crops. French soils are more fertile than those of Germany. Both rainfall and temperature are also favorable. The winds from the Atlantic bring abundant summer rains and mild temperatures. In the southeast France has a Mediterranean climate with winter moisture and warm, dry summers. Thus the country has a variety of surface, rainfall, and climatic conditions

which makes possible a great variety of agricultural production. Added to these advantages is the fact that French farmers seem to love the soil and take a great pride in their work. The only disadvantage in French agriculture has been the lack of scientific management, which made the yields per acre less in France than in Great Britain and Germany. Even so, French farms supplied the country with a large percentage of its food requirements.

Small-scale farming. French farms are usually small plots, averaging not more than twenty-five acres in extent. Instead of living in scattered farmhouses as our American farmers do, the French like to gather together in villages from which they can easily reach their small farms each day. These villages give the farm people the advantages of schools, churches, and social contacts which they would otherwise lack. On the farms there is a great deal of hard labor and the women do considerable work, especially in busy seasons. The small farms make machinery somewhat impractical, and French farms seem rather old-fashioned compared to those of the United States, especially the large farms of our Middle West.

Crops for food and fodder. In northern and central France the principal crops are wheat, potatoes, sugar beets, fruits, and vegetables, all of which are well suited to the climate of the Paris Basin. Wheat is the most important single element in the French food supply. The French people prefer white bread to dark, and this requires large quantities of wheat flour. In prewar France the per-capita consumption of wheat was considerably more than it is in the United States. As a result of this great demand France could not produce enough wheat to supply its own needs and was forced to import each year about fifteen per cent of its requirements.

In the southern Mediterranean region the chief crops are grapes, olives, figs, mulberry leaves for silkworms, and flowers for perfumes. Some corn is also raised in the southwest.

Grape culture. France was the leading wine producer of the world, with Italy ranking next. However, the French consume so much wine as a beverage that they imported annually more than one fourth as much wine as they produced from their own vineyards. France also exported some wine, but the quantity exported amounted to only about one fifteenth of the quantity imported. The making and marketing of wine was one of the leading industries. Many French wines have become world-famous and are known by the names of the regions where they are produced. Among them are Champagne, Burgundy, Moselle, Bordeaux, Sauterne, and others.



Photo by Kollar from Black Star

A vineyard near Cognac, France. Some of the noted French wines take their names from the places where the grapes are grown and the wine is made.

The different qualities of these wines come from the differences in soil, climate, and methods of production. Great care has been given to the propagation of hardy vines by grafting French varieties on strong roots from other countries. Generations of experience have given the French great skill both in grape culture and wine making. The leading vineyard areas are in the valleys of the Rhône, Loire, Garonne, and Moselle.

Domestic animals. Livestock are important in France both for beasts of burden and for foods and raw materials. Cattle are also used as work animals, but they also supply dairy products, meat, and hides for leather manufacturing. Many excellent breeds of cattle have been developed in France, but most of these are for general utility, that is, for both meat and milk production, rather than for one special use. Both butter and cheese were formerly exported. Special varieties of French cheese, such as Camembert and Roquefort, were eagerly sought in all parts of the world. Hides and skins supply raw material for the French leather industry, and large quantities were exported. The best cattle lands are in northern and western France. France has long been noted for its fine sheep, found mostly

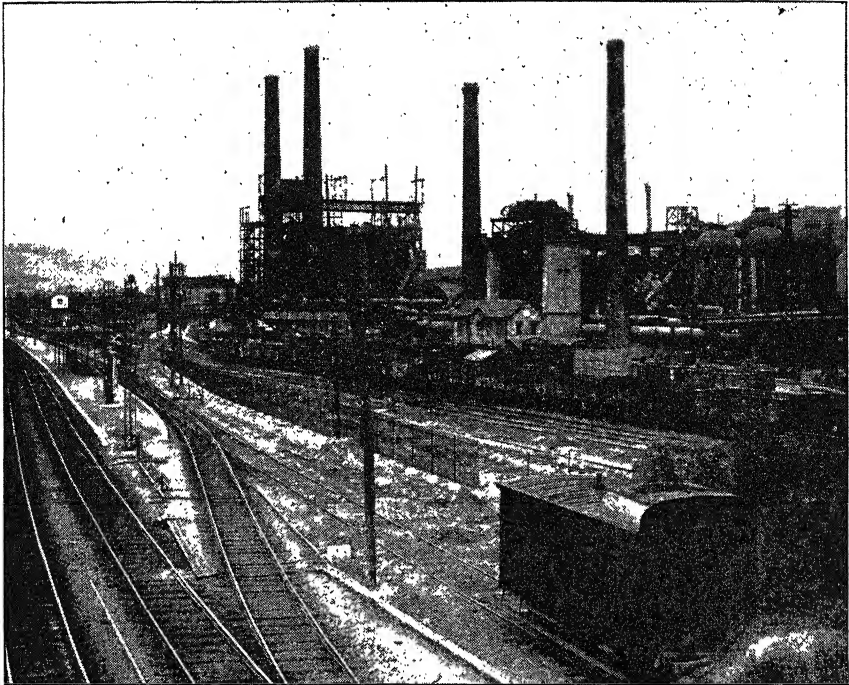


Photo by James Sawders

Iron and steel works in Lorraine, France. After World War I Lorraine was restored to France. Now the Germans have recaptured it.

in the southern highlands. The spinning and weaving of wool is one of the ancient industries of France, and its beautiful woolen fabrics are famous. Altogether the domestic animals of France in normal times are a valuable asset, both for food supply and for export products.

French forestry. Like Germany, France gave great scientific care to its forests; no waste was permitted and new trees were constantly being planted. Twigs, roots, and underbrush were used as fuel and paper was carefully saved to reduce the quantity of pulp wood used in paper making. The forests of the southwest produced large quantities of tar, turpentine, and rosin.

Mineral resources of France. France has never mined enough coal to meet its industrial needs. The chief deposits are in the north and are a continuation of the coal fields of Belgium. In normal times the coal imported came from Britain. When France controlled Alsace-Lorraine, it possessed great quantities of iron ore. France had a large iron and steel industry centered about Lille, Nancy, Le Creusot, and St. Etienne. To overcome its coal shortage France

has in recent years developed its water-power resources in the eastern, central, and southern parts of the country. While they were in possession, the Germans turned the French industries to the production of war materials for the German forces.

High-grade textiles. The number of people employed in the French textile industries was second only to those engaged in metal-working and machinery production. Large numbers were likewise occupied in the manufacture of clothing from French textiles. These textiles and the clothing made from them were probably the most valuable of all French manufactured products. In these industries the artistic skill of the French worker was very effective.

Choice silks. Silk manufacturing flourished in southern France for centuries, centering at Lyon, the greatest silk city of Europe. The climate of this section is favorable to the growth of the mulberry tree, on which silkworms feed. For that reason silkworms were introduced there and for a long time this French silk supplied most of the French needs. As the industry grew, it became necessary to import raw silk from Italy, Japan, and China. For a long time very little raw silk has been produced in France; yet French mills produced more silk fabrics than any other country in Europe. Only the United States surpassed France in the manufacture of silk textiles. A great deal of rayon has been produced in France though not so much as in Great Britain, Germany, and Italy.

Rare woolens. France was a pioneer in woolen manufacturing in Europe, and French weavers first brought the industry to England, where it became very extensive. The woolen industry was second to cotton manufacturing in its importance both in France and in England. The leading wool centers are in the northwest and in Alsace-Lorraine. About nine tenths of the raw wool used was imported.

Fine cottons. Cotton manufacturing was the most important of the French textile industries in the quantity produced, the number of workers employed, and the value of exports. French mills specialized in high-grade, beautiful fabrics which had a high value. All of the raw cotton was imported. Rouen, Lille, and Mulhouse (Mülhausen) are great cotton-textile centers. The reasons for the importance of cotton manufacturing in these three centers are interesting. Rouen is close to the great port of Le Havre, through which American cotton entered France. Lille is in the center of the great northern coal region, making fuel easily available. Mulhouse has abundant water power. The acquisition of Alsace-Lorraine by France added

greatly to the textile resources of the country, especially in cotton. Linen is woven in Flanders and Brittany, but it is not so important as other fabrics.

Artistry in French manufactures. The artistic nature of the French people has had a strong influence on the character of French manufacturing. In the value of its industrial products and the amount of its foreign trade France ranked next to Great Britain, the United States, and Germany; but French methods differed considerably from those of these other three great manufacturing nations. The French did not go in so much for mass production of standardized goods. They specialized more in high-grade and skilled workmanship, producing articles so excellent in quality and so distinctive in design that they found a ready sale in the world's markets. Such things as delicate laces, fine fabrics, beautiful tapestries, distinctive clothing and millinery, costly perfumes, artistic chinaware, and many other beautiful articles brought great profit to French manufacturers. Of course, there was some heavy industry and large-scale factory production in France, but the French have always depended mainly on skilled workmanship and artistic quality. Even French automobiles were largely custom-made.

Modern transportation. France is covered with a network of excellent highways, railroads, rivers, and canals. The highways reach every town and village in the country, and France used more motor trucks and buses than any other country in Europe.

The railroad mileage of France is the third largest in Europe. The total length of railroads is nearly 40,000 miles. Paris is a great railroad center from which lines radiate to all parts of the country.

Navigable rivers and canals supply more than 6000 miles of inland waterways which are of great value for the transportation of heavy materials, such as ore, lumber, coal, and steel. Barges and canalboats drawing less than nine feet of water carry an enormous amount of freight on these inland waterways, amounting annually to an average of 50,000,000 tons in normal times.

Before the war France had developed civil aviation to a high degree. Passengers, mail, and light freight could go by air to all parts of Europe.

In the tonnage of its merchant marine France ranked fifth in Europe before World War II, being exceeded only by Great Britain, Norway, Germany, and Italy in that order. Some of the finest transatlantic ships that came to the United States were French. In this transatlantic passenger trade, there was great rivalry among the ships

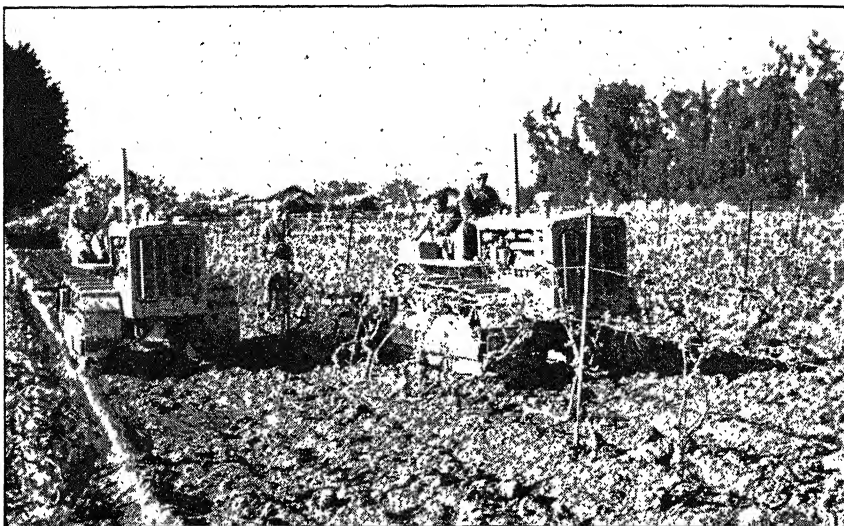


Photo by James Sowders

The most important business street in Marseille, France. The building on the left is the Stock Exchange. Marseille is the chief port of France on the Mediterranean.

of Great Britain, France, Italy, Germany, and Holland. Our American ships found it difficult to compete with these European vessels.

World-famed cities. Before Hitler plunged Europe into World War II, the cities of *Marseille* and *Bordeaux* were busy seaports connected with the interior by the waterways of the Rhône and Garonne valleys. Marseille refined vegetable oils and manufactured soaps and perfumes which were world-famous. Bordeaux is the center of a great wine-producing area. The Atlantic coast is the great commercial gateway of France. Here are located numerous smaller ports which together normally do an enormous shipping business. Among these are *Calais*, *Dunkerque*, *Le Havre*, *Cherbourg*, *St. Nazaire*, and *Nantes*. *Paris*, fourth largest city in Europe before the war, is famous for its beauty and art. Its museums and galleries contained some of the most famous pictures and sculptures of the world. Many of these have been taken to Germany. It was also a great manufacturing and distributing center. Buyers from all over the world formerly came here to select high-grade chinaware, fine laces and fabrics, and millinery and clothing which set the style standards for Europe and the Americas. So famous was Paris for its



Courtesy Caterpillar Tractor Company

Vineyard plowing and cultivation with modern agricultural implements and tractors in Algeria

beauty, its art, its music and drama, and its wide variety of products that there is an old saying: "See Paris and die."

French colonies. The French colonial empire is second only to that of Great Britain. At one time France held most of Canada and the Mississippi Valley and Great Lakes region. Canada was lost to Great Britain and the Louisiana Territory was bought by the United States. France also formerly held a large part of India, but this was also lost to Great Britain. France has since acquired vast new territories in Africa and in Asia. At the end of World War I France received a large part of the former German possessions in Africa called Togo and Cameroon. On the whole France has been quite successful in its management of its colonies, allowing the native peoples a large share of self-government and doing everything possible to improve their living conditions. In Africa the French and British possessions are about equal in area, being approximately 4,000,000 square miles each. The most valuable French territories in Africa are Algeria and Tunisia, from which necessary raw materials have been obtained.

All important French colonies in Asia are occupied by the Japanese; those in Africa have been freed from Axis control by the Allied forces.

Our interest in France. For centuries France exerted a powerful influence in the economic, commercial, and political affairs of

the world. Even today few countries are more deeply concerned with international relations. Although the honor is now shared with English, for many years in international conferences the French language was the "language of diplomacy." Relations with the United States have, in the main, been friendly even from colonial days. French pioneers explored and settled large areas of North America. The French rendered America assistance in the days of the Revolutionary War. Inspired by the outcome of that war, the French, with the watchwords of "Liberty, Equality, and Fraternity," soon after took the first steps toward their own democracy. With England and the United States it ranked as one of the three leading world democracies. At the time of World War I thousands of American and French soldiers fought side by side. Soldiers of the Free French army are fighting side by side with the Allies of today.

GUIDES TO STUDY

1. After the fall of France what were the terms of the armistice?
2. Why did not the Germans take complete control of the whole of France?
3. How has German occupation affected the lives of the French people and their industries?
4. What contributions have the French made to world progress?
5. How has the climate of France contributed to the success of French agriculture?
6. Why does the climate of southeastern France differ from that of the northwestern part of the country?
7. Why is France a leader in the production of wine?
8. How can a small country like France produce so large a part of the food needed by its large population?
9. In what ways do the French economize in their use of forest products?
10. What mineral and power resources does France possess?
11. What are the leading centers of the French textile industry? What advantages has each region for the work carried on there?
12. "The French sold skill and taste." What is the meaning of that statement? How did this help them to make the greatest use of their raw materials?
13. Why is France well situated for communication with other regions by land? By sea? By air?
14. How do the French colonies of today differ from those of former years?
15. Why are we interested in France?

TOPICS FOR CLASS DISCUSSION

1. The French in America. Americans in France.
2. Our interest in a free France.
3. French art in industry. French art in America.
4. French products in the United States in peacetime.

5. French names for American textiles. Why?
6. The French colonies in Africa.

WORK TO BE DONE

1. Assign to different groups for special study and report the following topics: Unoccupied France, Vichy Government, General Charles de Gaulle, General Henri Giraud, Corsica, the *Normandie*.
2. How has French art influenced American fashions and American industrial products?
3. Make a list of French products which come to this country in peacetimes. Why was each imported?
4. On a map of the world, color or designate by means of shading, French possessions. Of what value was each possession to France?

6. SWITZERLAND—AN ISLAND OF NEUTRALITY

Switzerland—there it stands. Without sacrificing its ideals, its honor, or its prestige Switzerland has remained an island of peace in an ocean of war. On its borders are the warring nations—Germany, Italy, and France. Within its borders live over 4,000,000 people, nearly 3,000,000 of whom are Germans, 800,000 French, and over 200,000 Italians. Each racial group speaks its own language and has retained many of its racial customs. Notwithstanding these facts the individuals who make up the various groups consider themselves Swiss nationals and have armed themselves to the limit of their ability to maintain their nationality. Switzerland is a shining example of what can be accomplished in the way of peaceful living by men of good will. Because of its role as a peacemaker among the nations Geneva was selected as the home of the League of Nations.

Although constantly fearing invasion, Switzerland has done its best to maintain a strict neutrality, and thus far that neutrality has not been violated. Bombing planes on various missions have flown over the country. Such acts are beyond the power of the Swiss to prevent although the planes do run the risk of antiaircraft fire. Economically the country has suffered severely. The people have been obliged to submit to German demands for supplies of various kinds. Furthermore, being an inland country, it has had many of the usual routes of trade cut off. It has also lost one of its greatest sources of income, its tourist trade.

The Alps and the plateau. Neutrality or no neutrality, probably the one factor that has made it possible for the country to retain its independence is the character of its surface. Switzerland is truly a land of mountains. Three fifths of its area lies in the region of the



Photo by Owen from Black Star

Automobile road through the St. Gotthard pass in Switzerland. The winding of the road has been planned to make the grade as gentle as possible.

Alps. The great ridges and valleys run generally from east to west, broken often by transverse valleys. Through some of these transverse valleys, or passes, there have been for centuries famous routes of trade. Three well-known passes are the Simplon, St. Gotthard, and Great St. Bernard. They connect Italy with Switzerland; beneath two of them are famous tunnels. It is claimed that the mining of the tunnels has been another deterrent to invasion. It is to the advantage of both Germany and Italy that they be kept open and in full operation.

Between the Jura Mountains on the northwest and the Alps on the southeast lies the central plateau on which two thirds of the people live. Here have grown up the cities of Zürich, Basel (Bâle), Geneva, and Bern.

Swiss character. The Swiss are a very intelligent and liberty-loving people. Their public-school system is excellent. Their government, a republic, is one of the most progressive in the world and is remarkably responsive to the needs of its citizens. The Swiss environment is most unusual; nevertheless their adjustment to it has been most successful. Neither great wealth nor abject poverty is found among the Swiss. The businessman is content with moderate profits. As a nation the Swiss are exceedingly thrifty.

Gifts of nature. Nature's greatest gift to Switzerland is its scenery. Its lofty mountains, its glaciers, and its sparkling lakes make it a tourist's and a sportsman's paradise. The housing, feeding, and entertaining of visitors is in peacetime Switzerland's greatest industry.

Because of its lack of other resources it belongs among what are called "the have-not nations," for it is almost totally lacking in coal, iron, copper, and petroleum. This is a great handicap. As compensation, however, nature has bestowed a marked abundance of water power, due to heavy rainfall, lofty mountains, snow fields, waterfalls, and lakes. The basis of industrial life throughout Switzerland is the hydroelectric energy that has been developed from the abundant and steady water power. Electricity is used in the homes and in the home industries, and two thirds of the railroads have been electrified. The greater number of the power sites are to be found along the eastern border of the plateau. Factories naturally have arisen in their neighborhood; so the cost of transmission of electricity is comparatively light.

Swiss farming. From the nature of the country we should not expect an extensive system of agriculture. Only about one eighth of Switzerland is farm land. The farms are found upon the plateaus and in the mountain valleys. The farms are small but are worked intensively. The main crops are potatoes and other vegetables, wheat, and common fruits. Switzerland is unable to feed all its population; so large amounts of foodstuffs must be imported. About one fourth of Switzerland is covered with forests and lumber is an important raw material for Swiss industries. Wood carving is a very common occupation.

Swiss dairying. In May the cattle are driven to the fields and, as the season advances, they graze higher and higher up the mountains until, at the height of the summer, they are feeding just below the receding snow line. Herdsmen remain with them. On the lower slopes are harvested two or three crops of grass to be stored for winter use. In normal times much condensed milk, milk chocolate, and butter are manufactured for export as well as for the home market.

Swiss manufactures. For hundreds of years the Swiss have faced the hard fact that their land is poorly equipped to furnish a living. Coal, iron, petroleum, and raw materials have to be imported. At the same time money must normally be sought through foreign trade. As a consequence of these conditions the Swiss have wisely determined to make their profit on articles that require little raw

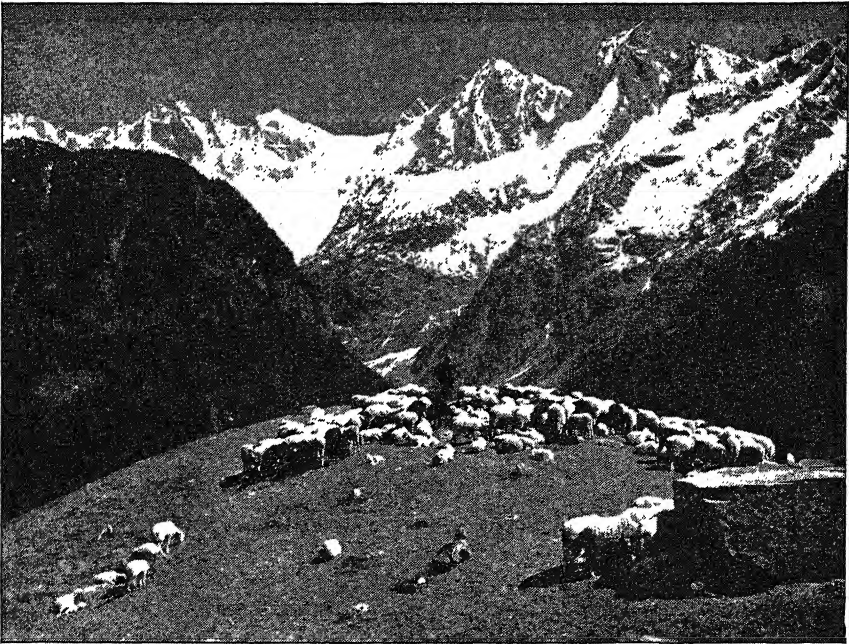


Photo by Steiner from Black Star

A mountain pasture in Switzerland. Flocks and herds are driven to the high pastures in the summer. When cold weather comes they are taken to the valleys for feed and shelter.

material and much skilled labor. It is the exquisite, painstaking work that gives their products their high market value. Much of the work is localized. In the Jura, for example, it is watches, watches everywhere. Some of the work is still done in the homes, but small factories are steadily increasing in number. One factory makes watchcases; another watch springs. Geneva is the great watchmaking center. Sometimes twenty million watches and clocks have been exported in a single year. Cotton and silk are manufactured in Zürich; Basel is the center for the silk-ribbon industry.

Railroads and tunnels. To build and operate railroads in a mountainous country is very expensive. Notwithstanding that fact, Switzerland has one of the most efficient railroad systems in all Europe. Most of the roads have been electrified; so it is the power of falling water that propels the trains through the mountain tunnels, over bridges, and up exceedingly steep grades.

Besides the ordinary freight and passenger service rendered by the railroads, some were developed for the tourist. Often these have called forth great engineering skill. The plateau region is best supplied with railroads. Several important railways entering Switzer-



Photo by Murkümper from Monkmeyer Photo Service

A Swiss railway where it crosses a deep mountain ravine. Few countries have had to contend with the engineering difficulties that the Swiss have encountered in building their 3200 miles of railways.

land from France and Germany have their routes determined for them by the Rhine and the Rhône Rivers. Connecting the North Sea with the Mediterranean, important lines cross Switzerland passing through the great Simplon and St. Gotthard tunnels. The Swiss have excellent automobile roads traversed by cars, many of which have come from the United States.

Swiss foreign trade. Almost fifty per cent of Swiss trade has been with Germany, France, and Italy, the three states upon its borders. Germany bought more than any other country and also furnished more imported goods. Both the United Kingdom and the United States have been leading customers. Although we bought much from Switzerland, sales to that country always surpassed our Swiss imports in value. Our most valuable imports from Switzerland have been watches, clocks, machinery, silks, cottons, embroideries, and dairy products. Because of the great labor and exquisite skill bestowed upon their production, Swiss exports, ton for ton, are of higher value than those of other commercial nations. The people of no other nation are more clearheaded and practical in the conduct of their business affairs than are the Swiss.

GUIDES TO STUDY

1. Although Switzerland has not been invaded, how has the war affected the lives of the people and their industries?
2. How do the Alps influence the distribution of population in the country? Why?
3. Why do more people live on the plateau than in the mountainous region?
4. Why does Switzerland have a great deal of water power and what use is made of it?
5. Why is the country better adapted to grazing than to the cultivation of crops? What are the products of the Swiss dairies?
6. Why do the Swiss use little raw material in their manufactures?
7. Why do many tourists visit Switzerland?
8. In what ways are these visitors a help to the country?

TOPICS FOR CLASS DISCUSSION

1. The Swiss people.
2. Wealth from the Alps.
3. Life in the Swiss Alps.
4. Switzerland a land-bound country.

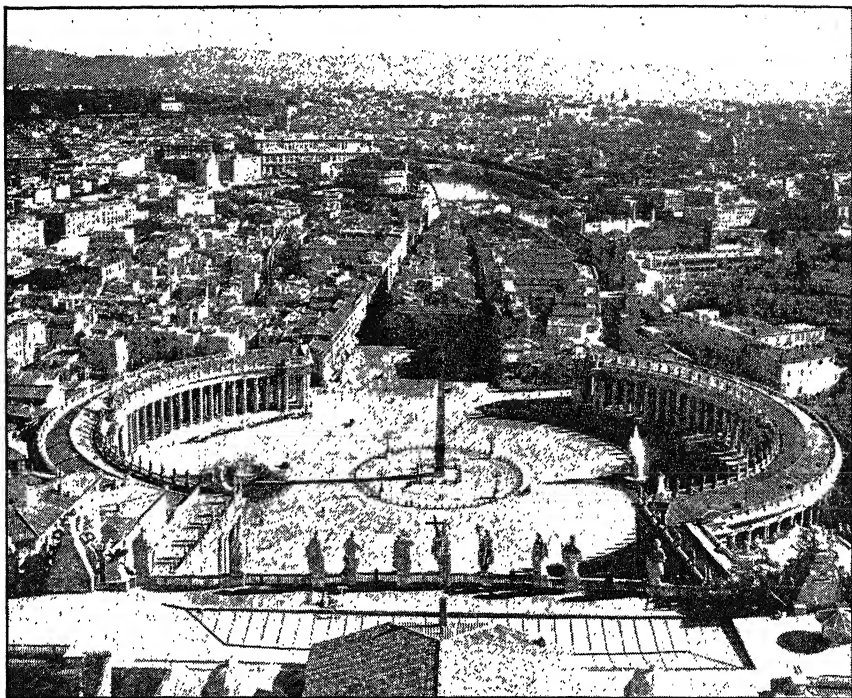
WORK TO BE DONE

1. Collect stories and legends of Switzerland which give a knowledge of the country itself and of the characteristics of its people.
2. On a detailed map of Europe locate the noted passes and tunnels of the Alps and find out how each helps to connect the country with other lands. It is said that the Swiss have mined their tunnels. Why?
3. Prepare a report for the class on the topic: Why I would like to visit Switzerland.
4. Have the Swiss national air played for the class.

7. ITALY—A NATION MISLED

ITALY UNDER MUSSOLINI

Italy and North Africa. President Benes of Czechoslovakia once said, "A dictator is like a bicycle rider; he must keep pedaling or he will fall off." This seems to be one of the reasons at least why Mussolini in 1935 felt it necessary in order to retain the confidence and full support of the Italian people to add to the country's colonial possessions. In a comparatively short time he defeated the Ethiopians and brought their country under Italian control. Following the first World War the Italians felt that they had not received the rewards promised them for their assistance in fighting Germany and Austria-Hungary. Therefore, Mussolini came to the conclusion that the only

*Photo by James Sawders*

Rome. Looking across the city from the balcony of Saint Peter's.

way for Italy to add to its colonial empire was to go out and take lands from others.

The victory brought glory to Italian arms and greatly increased the confidence of Mussolini in himself. Following Hitler's occupation of Austria and Czechoslovakia Mussolini began to make demands upon France for the "return" to Italy of Corsica, Nice, and Savoy. Clearly the only basis for these claims was that, since these regions had once been Italian, they should be restored to their former owner. Mussolini demanded that Tunisia be ceded to Italy for the reason that a large proportion of the people are Italian. He asked that Jibuti in French Somaliland be given to Italy because that settlement is the terminus of the railroad leading to Addis Ababa, the capital of Ethiopia. Mussolini demanded also a share in the control of the Suez Canal which is owned and operated jointly by France and England.

Soon after the entry of Italy into the present war its planes, warships, and armies came into conflict with those of Britain in the Mediterranean region.

Mussolini had claimed that the Mediterranean should be first of

all an Italian sea. This could not be possible while Gibraltar and the Suez were held by the British. Therefore, he hoped to wrest control of the Mediterranean from the British by the use of his warships and airplanes and by sending his armies through Albania to Greece and through Egypt from Libya to the Suez. As we have seen, the defeat of Greece was made possible only with the help of Hitler's forces. Mussolini was not successful in gaining control of the Mediterranean or of the Suez. The Italians lost Ethiopia, Eritrea, Italian Somaliland, and Libya—all of Italy's foreign possessions except a few small islands in the Aegean Sea. After the defeat of the Axis forces in North Africa, Pantelleria and other small islands surrendered to the Allies. Then the Italians lost Sicily to the Allies, and Mussolini was deprived of his premiership. Finally Italy surrendered unconditionally and became a cobelligerent with the Allies. German troops were rushed to Italy and have offered stiff opposition to American and English troops as they battled northward.

ITALY IN BETTER DAYS

Italy's contributions to the world. Italy's gifts to the world have been most generous. The influence of the Latin tongue is seen wherever the Romance languages are spoken and in the English language as well. The principles of Roman law have come down through the centuries and serve as the basis of much of the law of today. Italian science gave the world the telescope, the barometer, and the radio. Operas written by Italian composers are enjoyed the world over. The palaces and cathedrals of the country show the handiwork of the greatest architects and artists of all time. Italy has transmitted to other lands the best that it has received from the past and its own creations as well. All the world has entered its doors for education and inspiration. Its contributions have been to the spirit of man as well as to his financial welfare.

The lure of Italy. In normal times thousands of tourists have flocked to Italy every year. Why did they go? First, there is natural beauty: sparkling lakes set amid lofty Alps; blue Mediterranean waters, picturesque shores with palms and vineyards; even snow-crowned volcanoes. Then there is the record of man's achievement as revealed in art galleries, museums, and churches. Everywhere in crumbling monuments and ruins can be traced the historic records of the great Roman empire. The Italians of today are a winning and courteous people; their leading cities are impressive. No wonder that

wealth flowed into Italian coffers by reason of the travelers within its gates! The tourist trade was a steady source of revenue.

A pioneer in commerce. Europe learned its first lessons in navigation in that inland sea, the Mediterranean. Later, the bolder spirits pushed beyond the Strait of Gibraltar to venture out upon the great ocean. Italian seamen, from the earliest days, have been great adventurers. The world will never forget Columbus, Verrazano, Amerigo Vespucci, and the Cabots, all early Italian discoverers and explorers. After the discovery of America and the rounding of the Cape of Good Hope, much of the world's commerce left Mediterranean waters for the Atlantic. This shift was due not only to the tremendous widening of the world's horizons, but also to the fact that the natural resources of Northwestern Europe were far richer than those of Southern Europe. Thus Italy and other Mediterranean countries dropped to second rank. Mussolini with ambitious plans for his African colonies had expected to restore the lost prestige of this inland sea.

Italian commerce. The opening of the Suez Canal in 1869 brought renewed opportunity to Italy and to the millions of people living on Mediterranean shores. Italy occupies a dominating position in the Mediterranean, close to the major countries of Europe and midway between Gibraltar and Suez. It has several first-class harbors, out of which have sailed its fine merchant ships and its ocean liners. Out through the Mediterranean gateways they went—through the Suez Canal to the east and the Strait of Gibraltar to the west—carrying Italian goods to far corners of the world. Ships from the Orient and from America used Italian harbors as ports of call. Before World War II only five other European countries had more ships than Italy engaged in international trade.

Surface features. The relief of a country is always a great factor in influencing its agriculture and its industries. The Alps and the Apennines are the chief mountain ranges of Italy. The massive Alps separate Italy from Switzerland and Germany. The Apennines, running generally north and south, form the backbone of the peninsula. Italy's most famous plains are the wide, rich valley of the Po, the valley of the Arno, the Roman Campagna, and the Neapolitan plain. In the valleys north of the Po River are found beautiful glacial lakes—Maggiore, Lugano, Como, and Garda. Italy includes two large islands, Sicily and Sardinia. Mt. Etna, one of Italy's famous volcanoes, is in Sicily. Its perfect cone, capped with snow, rises 10,758 feet above the sea. Even more famous is Vesuvius, near Naples.



Photo by James Sawyers

Plowing the rich soil of the Pontine marshes near Rome. These rich farm lands were reclaimed from mosquito-infested marshes.

Farming—the leading occupation. The Italian people are natural gardeners. Almost half the working people in Italy are normally engaged in farming. Nevertheless there is not enough food raised to meet the needs of the nation; large quantities must be imported to feed them adequately. The crops and methods of farming are quite different in the north from those in the south. Combining their skill in gardening with their love for beauty, the Italian people have created some of the most beautiful landscape gardens in the world.

Farming in the north. Agriculture is at its best in the Po Valley. The plains of this fertile valley were built up by the silt washed down from the mountain slopes. The rainfall of the region is light, but the very streams that brought down the soil also bring down water to be used for irrigation to supplement the moderate rainfall.

Many crops grown here, particularly rice, require irrigation. Other important products are wheat, Indian corn, potatoes, and vegetables. Hay and other forage crops are extensively grown, and hemp is raised in smaller quantities. The mulberry tree flourishes in the Po Valley, and much silk is produced there. Only Japan and China surpass Italy in the production of silk.

Farming in the south. Conditions are less favorable here than in the north. The climate is drier, and there is little rain in the summer.

Good crops follow careful irrigation, but irrigation is expensive and the people are poor. As a natural result the Italians of the south have come to depend upon drought-resisting crops. These are grapes, olives, and wheat. In general agricultural methods are careless in southern Italy. Little attention is paid to the rotation of crops, and harvests are apt to be small and uncertain.

Vineyards. The Italian farmer depends upon his vineyard for a large part of his income. In winter the level ground is often given over to cultivation of several varieties of low-growing vegetables. As summer approaches, the ground is trenched in order to catch all possible rainfall. Closely trimmed mulberry trees often furnish the needed support for the grapevines. Although the Italians are expert vineyardists, the French, who follow the single-crop plan, surpass them in the quantity of grapes produced. Most of the grapes are made into wine. Some are used for raisins, for which there is a great demand.

Olive orchards. The olive grows best in a somewhat dry climate, such as is found in southern Italy, southern France, Spain, and northern Africa. Gnarled olive trees with their gray-green foliage are a picturesque feature of the Italian landscapes. Olive trees live for hundreds of years. They require little care, and the entire crop is harvested at one time. The ripe olive is an exceedingly important article of food. Olive oil is a substitute for butter, a vital fact in this country of scanty milk supply. Olive oil was formerly an important export. Great quantities of Spanish olive oil have been imported into Italy, there to be refined and blended with the native product. No other country except Spain raises so many olives as Italy nor devotes so much acreage to this important staple.

Wheat fields. Wheat is grown in all parts of Italy. Even in the dry regions of the south the yield is very fair considering the adverse conditions. Production is greatest in the Po Valley. Wheat is much needed for bread and for macaroni. The Italians are as fond of wheat as are our people; their per-capita consumption in normal times almost equals our own. So great is the demand for wheat that small quantities must usually be imported to care for the nation's needs. At the north very close planting and the moist climate result in wheat with long stalks. The famous Leghorn hat is plaited from the long straws of this tall variety of wheat.

Citrus fruits. Italy is surpassed only by the United States as a producer of lemons, and it is one of the four great orange-growing countries of the world. The island of Sicily grows most of the

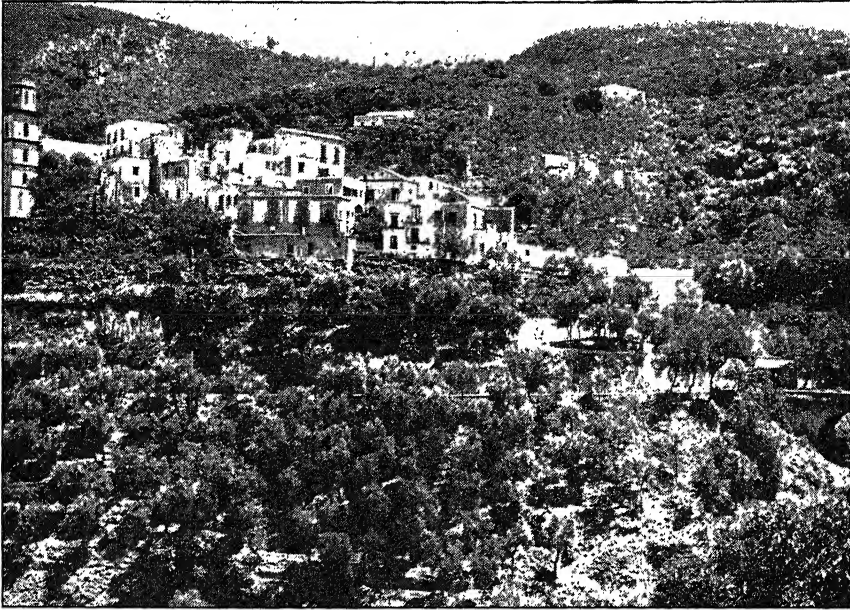


Photo by James Sawders

Olive groves on an Italian hillside. The olive tree is well adapted to a region having a limited supply of rain. Italy's rain falls mostly in the winter.

lemons, and oranges are raised near by on the mainland. The fruit trees are always a beautiful sight. In the spring fragrant white blossoms, green fruit, and golden fruit, all may be seen on the same tree. A choice brand of oranges comes from Messina.

Domestic animals. In the upper valley of the Po and on the Alpine slopes grass grows well because of the abundant rainfall. Here is the dairy district of Italy and cheese is the chief product. Little butter is needed because Italians use olive oil instead. Italian cheese has been exported to many foreign markets. In southern Italy, where pasturage is scanty, sheep and goats are raised. Herds of goats are driven through the village streets in the morning and are halted to be milked at the customer's door. Mules and donkeys are largely used instead of horses.

The rise of manufactures. In spite of unfavorable climatic conditions agriculture has been the chief means of support of the population of Italy. The nation has no coal and very little iron; in fact, there is a scarcity of nearly all the essentials for building up great industries. During the last century, while Great Britain, Germany, France, and Belgium were making their marvelous advance in the use of modern machinery, Italy showed little industrial development.

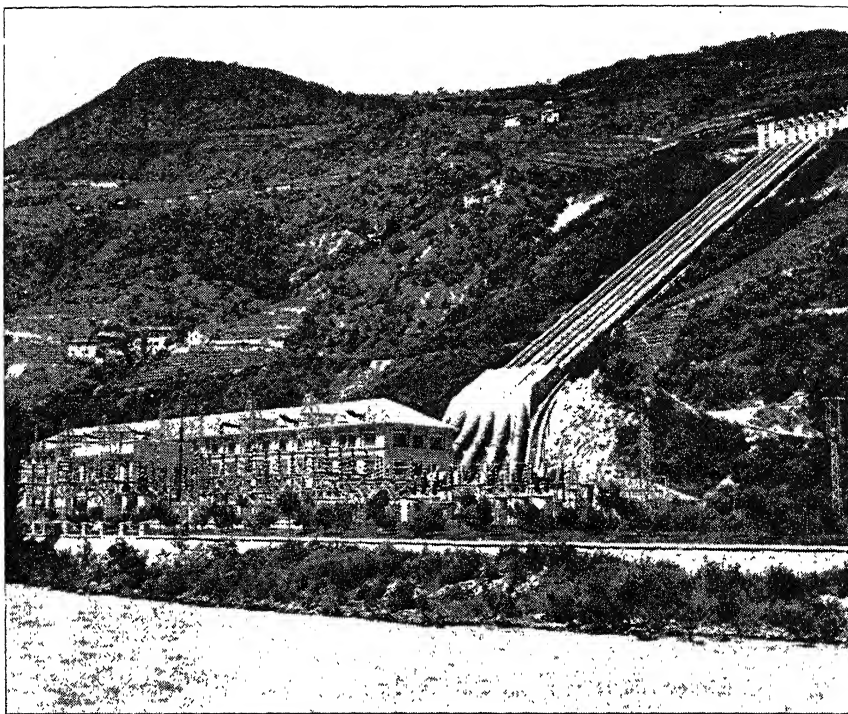


Photo by De Cou from James Sawders

A power plant in the mountains of northeastern Italy. The water power of Italy is of great importance to the country since it has no coal.

But its attitude has changed entirely in the last thirty years or more. Seeing large numbers of its people emigrating to foreign lands, Italy awoke to the fact that it must provide more work at home. Agriculture has been stimulated, but a decidedly vigorous emphasis has been placed upon industrial development.

Great power resources. When it was discovered that water power could be changed into electric power and that this power could be easily transmitted long distances, Italy came to realize the great opportunity for industrial wealth within its own gates. Then it manifested its great interest in industrial development and its urge to acquire more colonies to provide the necessary raw materials and markets. Since World War I there has been rapid progress in the use of hydroelectric power. By 1930 Italy led all the European countries in this respect. About sixty per cent of its potential power is now available for lighting and heating, for railroads, and for manufacturing. The southern slopes of the Italian Alps have an abundant rainfall, and many rapid streams rush down from the high mountains.

This is, therefore, the region where electric power is most easily produced and where industry has made its greatest progress. In central and southern Italy the Apennines, though lower and more arid than the Alps, possess important power facilities which await later development.

Varied industries. The textile industries have given employment to the greatest number of workers. In northern Italy the weaving of native silk and the manufacture of imported cotton were leading activities. Rayon too was manufactured on a large scale. Other important industries are the preparing and bottling of olives for the market, the making of olive oil, and the manufacturing of extracts of orange, lemon, and lime. Macaroni in many varieties is prepared from wheat; Leghorn hats from wheat straw; beads and necklaces from coral and crystal; and statuary from marble and alabaster. Naples is noted for its kid gloves and shoes; Venice for its exquisite glassware.

Cities of importance. Few countries have so many cities renowned throughout the world as Italy. Rome, on the seven hills above the Tiber River, is the capital and the largest city. Vatican City, the seat of the Pope, is the smallest independent state in the world. It is located near the Tiber and its area is only one sixth of a square mile. The chief ports are Genoa and Naples on the mainland and Palermo on the island of Sicily. Italy has many important industrial cities—Milan (Milano), Turin (Torino), Genoa (Genova), Naples (Napoli), Florence (Firenze), Venice (Venezia), Trieste, and Leghorn (Livorno). The historic and artistic appeal of many of these cities is so great that visitors have come from all quarters of the globe to visit them.

Italy's colonies. Italy's foreign dependencies were not extensive. They consisted of Libya and Ethiopia, a recent conquest; Eritrea, on the Red Sea; Somaliland, on the Indian Ocean; and certain Aegean islands, ceded by Turkey to Italy. As we have already seen, all the African possessions have fallen under the control of the Allied armies and Haile Selassie has been restored to his throne in Ethiopia. The possession of these colonies resulted in no great enlargement of Italian commerce.

International trade. By reason of its limited resources Italy's imports exceed its exports in value. In normal times the United States sells to Italy raw cotton, metals, wheat, and petroleum products. From Italy we buy cheese, fruits, nuts, olive oil, raw silk, textiles, hats, marble, and alabaster. This trade is carried on through

Naples and Genoa, the leading ports. In the interior the chief center for industry and commerce is Milan, the largest city of Italy after Rome. By means of Alpine passes and tunnels Milan carries on an extensive trade with Northern Europe.

GUIDES TO STUDY

1. What were Mussolini's purposes in attacking Ethiopia?
2. Upon what grounds did Mussolini claim French territory? In what ways did his ambitions conflict with British interests?
3. What losses has Italy suffered up to the present time?
4. For what great contributions is the rest of the world indebted to Italy?
5. What does Italy offer the tourist?
6. It has been said that Italy was once at the front door of Europe; now it is at the back door. Explain the statement.
7. How did the opening of the Suez Canal again stimulate Italian commerce?
8. What is the significance of Italy's plains and mountains?
9. How do the crops of northern Italy differ from those of southern Italy? Why?
10. In what different ways does the olive serve the people?
11. What different purposes does the wheat crop serve?
12. Account for the distribution of the domestic animals of Italy.
13. Why is agriculture the chief occupation of the people?
14. What are the sources of Italy's water power and what use is made of it?
15. How are the artistic abilities of the Italian shown in their arts and industries?
16. Of what value were Italy's colonies?
17. What were the country's chief exports and imports?

TOPICS FOR CLASS DISCUSSION

1. The rise of Mussolini.
2. In what ways did Mussolini render real service to Italy?
3. The work of early Italian explorers.
4. What Italy gains from the tourist trade.
5. Italians in other lands including the United States.

WORK TO BE DONE

1. Special reports to the class on great Italian leaders.
2. "Artists and architects of the past bring Italy wealth today." Explain.
3. In the days of the "Merchant of Venice" the discovery of a new route to India around the Cape of Good Hope was considered a calamity by the Venetians. Why? "The opening of the Suez Canal in 1869 brought renewed opportunity to Italy." Explain.
4. Special reports on each of Italy's former colonies.
5. By means of newspapers, magazines, and radio keep in touch with pres-

ent-day changes in Italy. Note how the country is governed and its relationship to the Allies.

8. SPAIN AND PORTUGAL—A NEUTRAL PENINSULA

A training field for World War II. Spain, strongly pro-Axis but listed as a neutral, has had little open participation in World War II. Its only overt act has been the occupation of the French-controlled international zone in North Africa opposite Gibraltar. Both the Axis partners and the Allies have by turns tried to woo and to intimidate Spain, but it is still too tired and exhausted from its own civil war to bear arms in the defense of anything outside its own borders. The present regime under Franco, which has been recognized by both the United States and Great Britain, owes its existence to Hitler and Mussolini. Both of them were preparing for war—Mussolini for the building up of an Italian empire, Hitler for the conquest of the world. Under the guise of helping Franco to drive communism out of Spain, they sent armies of so-called "volunteers" to his assistance.

Russia sent assistance to the so-called "Madrid government" which was opposing Franco. Britain and France, hoping to localize the war, kept to the sidelines. Their attitude gave the Axis leaders a very good idea of how far they could go in carrying out their plans before either would intervene.

When the revolution was quelled, although Spain did not become an open ally of Germany and Italy, Mussolini and Hitler were amply rewarded. Spain had given them a training field where a dress rehearsal for World War II was worked out. Were the Axis Powers to be victors, however, there is no doubt as to where Spain would stand. Hitler long ago offered Franco Gibraltar in return for his assistance. Anything that would not jeopardize the very existence of Spain itself would be a cheap price to pay for the return of that stronghold, lost to Britain over two hundred years ago.

The Iberian Peninsula and its people. Spain and Portugal together occupy the most western peninsula of southern Europe, known as the Iberian Peninsula. Because of its location the Iberian Peninsula was for centuries a very whirlpool of tribes and races from the shores of the Mediterranean and beyond. As these tribes in succession fought their way to the Atlantic, they overwhelmed and mingled with those who had preceded them. The Moors, who conquered and occupied Spain for about seven hundred years down to

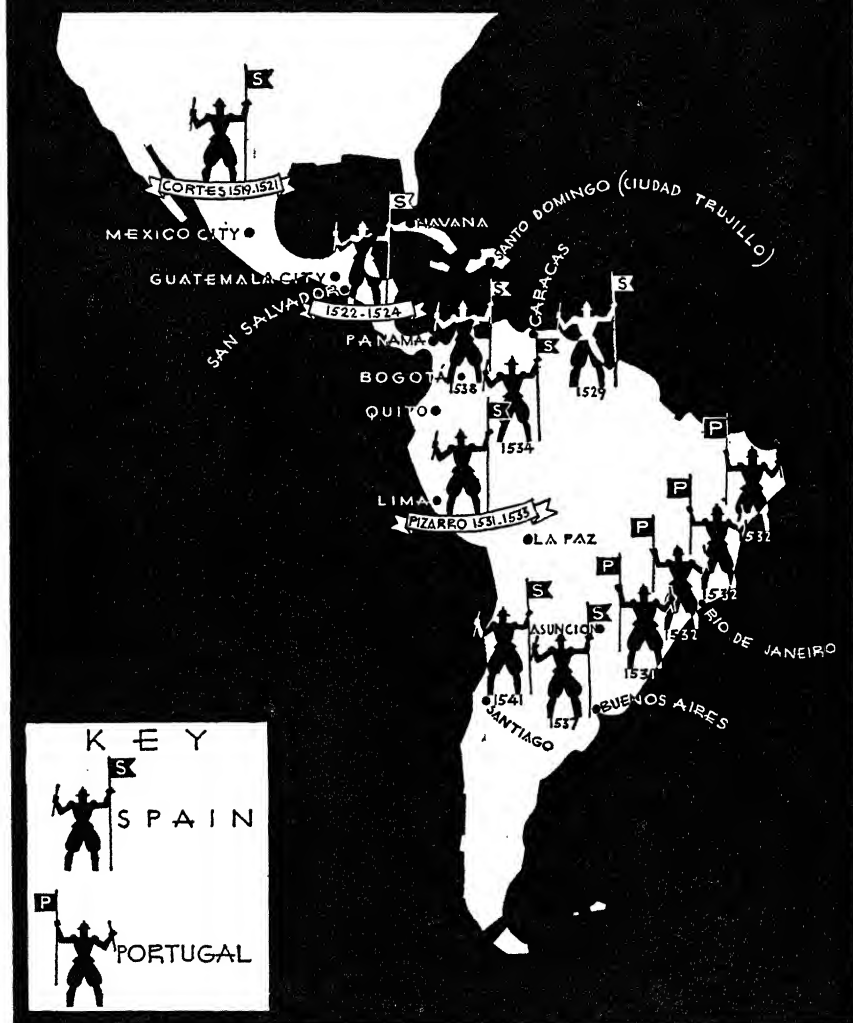
the time of Columbus, left a deep impression in art, architecture, and other standards of civilization. With the blood of all these hardy and venturesome races in their veins the Spanish and Portuguese people were quick to catch the spirit and follow the example of Columbus and become the pioneers in navigation, exploration, and ruthless conquest.

Glories of the past. In the sixteenth century Spain was one of the wealthiest and most powerful nations in the whole world. This was due to its conquest and plunder of the Americas. The Italian Columbus, financed and outfitted by Queen Isabella of Spain, discovered the New World. Many Spanish expeditions followed to find and explore new regions of the unknown continents. They returned with riches and with claims of boundless wealth yet to be discovered. As a result Spain became possessed of a vast colonial territory, consisting of almost all of Latin America except Brazil. It also owned Florida, which then had the Mississippi River as its western boundary; much of our country beyond the Mississippi; and the Philippine Islands. Here was the wealth of a powerful empire.

Then disaster befell Spain. Its days of conquest over it settled down to enjoy its acquired riches. It had always been more eager to secure gold and silver than to build up strong colonies which, by agriculture, industry, and commerce, could become self-supporting provinces. As a result of its short-sighted policies all Spain's South American and Central American colonies, with Mexico, revolted over a century ago and declared themselves free and independent republics. As a result of the Spanish War, in 1898, Spain lost Cuba, Puerto Rico, and the Philippine Islands. Today the Canary Islands and a few other small possessions along the west coast of Africa are all that remain of Spain's former colonial empire.

Decline and revolution. Handicapped by poor soil, lack of transportation, unsatisfactory methods of farming, and a not too stimulating climate, Spain after the loss of its colonies sank into apathy, with little desire to make the most of what it had. The loss of its colonies, however, by putting the people on their own resources, might have been a blessing in disguise had they had intelligent leadership. That lacking, they were easily stirred into unrest by certain radical and communistic factions. As the result of a political upheaval, Alphonso XIII, born their king, went into exile in 1931 and a socialistic republic with a written constitution was set up. Church and state were separated, Church property confiscated, and plans were made for taking lands from the rich and giving them to

CONQUESTS of the CONQUISTADORES



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the poor. The outcome was revolution and counterrevolution resulting in the bloodiest civil war of all time. Madrid and other cities were unmercifully bombed. Thousands of people were killed or died of starvation. With the fall of Madrid the war ended, and the dictator, Franco, came into power.

Farming and crops. Agriculture is the chief occupation of Spain and Portugal. The lands best adapted to farming lie on the coastal



Photo by Metcalf from Black Star

Spain's chief industry, farming, is still primitive. Modern methods and machinery are little used.

plain bordering the Mediterranean and in the broader parts of the Ebro and Guadalquivir valleys. These are the sections most densely populated and best adapted to irrigation. North and northwest of Madrid is an important wheat-growing area. Eighty per cent of the wheat needed for native use is grown in the home country. Great quantities of Spanish onions, tomatoes, and other vegetables grown here formerly found their way to the markets of northern Europe and even to distant America. The cane-sugar industry of southern Spain has been much reduced by the competition of sugar beets, grown in this eastern section. But Mediterranean fruits—the olive, the orange, and the grape—are here the leading crops.

Spain formerly was the world's leading orange-growing country, and the Valencia orange is famous throughout the world. More than three quarters of all the Spanish oranges are grown near this little city. Most of the oranges that are eaten in Europe are exported from Spain.

Another valuable fruit crop comes from the vineyards. The vines are grown on terraced slopes along the Mediterranean. The grapes are made into wine or raisins. Malaga is a great center for this crop; large quantities of its grapes before the war were exported to the

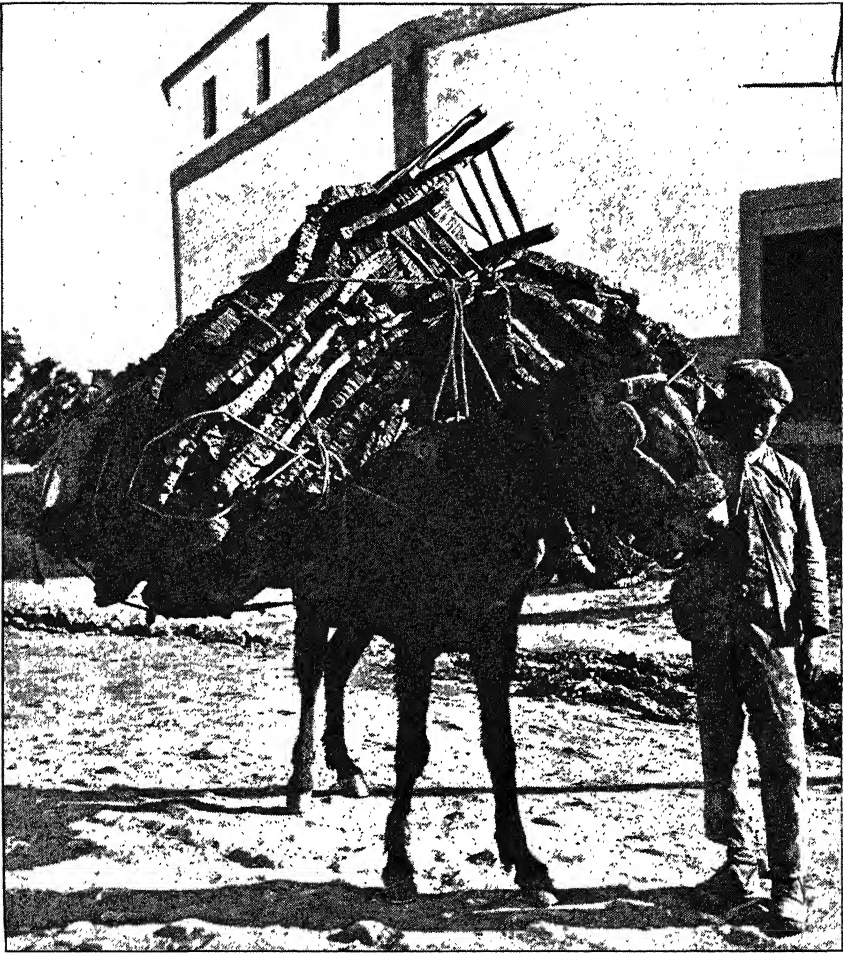


Photo from Philip D. Genureau

Cork, one of Spain's important products, being transported by one of the country's common carriers—the donkey

United States. Port and Madeira, famous wines made in Portugal, owe their names to the city of Oporto (Porto) and the Madeira Islands. Other valuable fruits are the lemon and the fig. Almonds, filberts, or hazelnuts, and chestnuts are also raised in abundance.

Cork. Cork is a most important crop in the peninsula. Cork trees are found almost exclusively there and in northern Africa. They resemble oak trees and are planted in orchards. Cork, which is the outer layer of bark, is light and elastic and from one to two inches thick. A cork tree yields bark every six to ten years for about one hundred fifty years. Spain and Portugal together



Photo by Metcalf from Black Star

Spain's sheep and goat population numbers almost 20,000,000 head.

supply about eighty per cent of the world's output of cork. Portugal alone furnishes fifty per cent. Cork is used for stoppers, artificial limbs, inner soles for shoes, and floats for nets. The making of corks is one of the chief industries of Portugal.

Domestic animals. Spain raises more sheep than any other country in Europe except Great Britain and Russia. There are numerous goats but comparatively few cows. The beasts of burden are mainly mules and donkeys since they are more hardy than horses and require less food. The pastures of the central plateau are the large grazing areas of the peninsula.

Wealth of the mines. There is a great variety of minerals in Spain and Portugal, but so little skill in mining and smelting that the iron ore was shipped to Great Britain, Germany, and other countries for reduction. Abundant coal is found near the iron mines, but it is not mined to any great extent. Instead, Spain imported coal from Great Britain. Lead in crude form was shipped to other countries for manufacturing. Spain led Europe in the production of copper.

Tardy industrial development. Comparatively little manufacturing is carried on in Spain or Portugal. In the old days small local

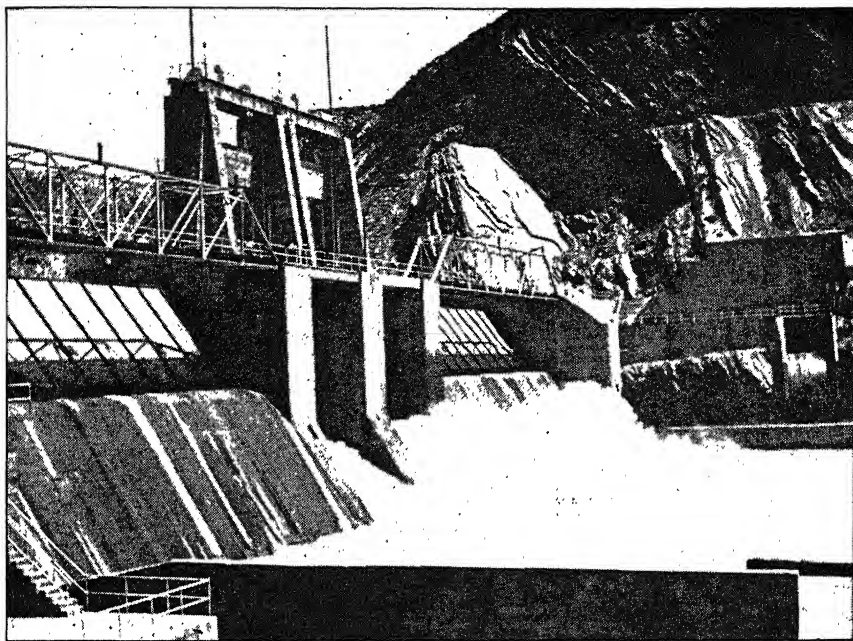


Photo from Triangle Photo Service

The dam and power station at San Lorenzo, near Lérida. Spain has developed only about one fifth of its potential water power.

mills were erected to prepare food or partially to work certain minerals. For example, there were gristmills, sawmills, tanneries, and kilns for making bricks and lime. Of late years electric plants have been introduced which supply light and power. Barcelona and Lisbon (Lisboa) are the leading industrial cities. Barcelona employs much hydroelectric power, using for this purpose the streams from the Pyrenees Mountains. This city makes great quantities of woollens for home use and also cotton cloth. Lisbon is also a center for manufacturing cotton cloth. Bilbao builds ships and also manufactures pig iron and steel. Seville is an important center for preparing olive oil. Tobacco products are manufactured in northern Portugal.

Varied handicaps. Two physical hindrances greatly hamper Spain and Portugal in their competition with other nations. These are their rugged surface and their dry climate. The Iberian Peninsula is a massive plateau with an average height of 2200 feet. From this central plateau rise lofty, snow-crowned mountains. The lowlands comprise the deep and narrow river valleys and a narrow coastal plain with few inlets edging the plateau. The slopes of both coastal plains and river valleys are so steep as to make their ascent

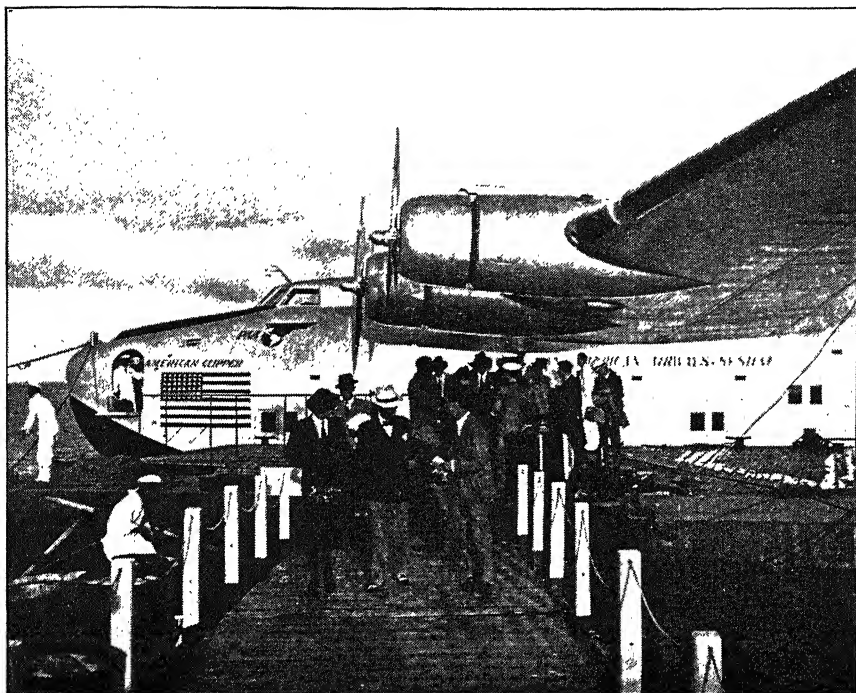
difficult by both highway and railroad. The Guadalquivir is the only navigable river of any importance.

High and dry. The two countries have the typical Mediterranean climate. The scanty rainfall occurs in the winter, and the summer season is hot and dry. Spain is less fortunate than Portugal in the matter of rainfall. In the latter country prevailing westerly winds from the Atlantic bring much moisture to fall, as rain, on the Portuguese highlands.

Few railroads. Commerce and industry are always stimulated by the coming of railroads. Spain and Portugal are both handicapped by adverse physical conditions. The high plateau, cut by deep valleys, hampers railroad construction, and mountain ranges block the way. For generations the lofty Pyrenees Mountains furnished almost a complete barrier to overland trade between the peninsula and the rest of Europe. Only through the ends of the great mountain mass, through its eastern and western gates, as it were, could railroads penetrate into France. Not until 1928 did the first railroad cross the Pyrenees.

A leader in discovery and exploration. Portugal, like Spain, was a leader in navigation and commerce. Under the stimulation of Prince Henry the Navigator, little Portuguese vessels crept farther and farther down the African coast. Later Vasco da Gama rounded the Cape of Good Hope and opened the route to India. In the New World Brazil fell to Portugal. This rich territory was a welcome source of wealth to the mother country. Portugal followed the same heedless policy as Spain in dealing with its colony and similar results followed. In 1822 Brazil declared its independence. Today the Portuguese possessions are the Azores, Madeira, and Cape Verde Islands in the Atlantic Ocean and Portuguese Guinea, Angola, and Mozambique in Africa and Gôa, Macao, and Portuguese Timor in Asia.

A friendly neutral. Since 1910 Portugal has been a republic. Although the change from a monarchical government was brought about by a revolution, internal affairs have been capably managed. If the new regime has had any difficulties, they have not involved the peace and security of other nations. The country enjoys freedom of worship as well as a modified freedom of suffrage. Portugal is a traditional ally of Great Britain. The capital and chief port is Lisbon. That city, once acclaimed as a seaport, is now an airport too, with a shuttle service to Great Britain and transoceanic service to America.



Courtesy Pan American Airways System

The Pan American Clipper moored at its base in Lisbon. Once aboard this plane, many hundreds of refugees have said prayers of thanksgiving because their next stop was to be free America.

Lisbon. The name of that city has probably been indelibly written in the hearts and minds of more Europeans than that of any other city in the world. Thousands of terror-stricken refugees, hounded by their relentless pursuers, have tried to make their way to that Portuguese port on the Atlantic, the one outlet for the whole of suffering Europe. Nothing in its past, politically or commercially, can ever compare with the great and good name that it has won in World War II: *The gateway to life and liberty.*

GUIDES TO STUDY

1. Why did Germany, Italy, and Russia take part in the Spanish Revolution?
2. In the days of Spain's greatest prosperity what was the extent of its colonial possessions? How were many of these colonies lost?
3. What have been Spain's greatest handicaps?
4. Where are Spain's best agricultural lands?
5. What are the leading crops and where is each raised?
6. What fruits and wines are well known even outside the country?
7. Although Spain has supplies of iron and coal, iron ore is exported and coal is imported. Why is this done?

8. What surface and climatic factors work to Spain's disadvantage?
9. What was accomplished by early Spanish explorers?

TOPICS FOR CLASS DISCUSSION

1. The glory of old Spain.
2. Spain's aid to Columbus.
3. The acquisition and loss of colonies in America.
4. The Spanish-American War.
5. Transportation in Spain and Portugal.
6. Portugal as a country for refugees; as a center for air lines.

WORK TO BE DONE

1. On a map of the world locate the areas once held by Spain and Portugal. Of what value are these regions today? What are the possessions still held by each country?
2. Let some member of the class report on the work of Prince Henry the Navigator.
3. Assign to some member of the class the topic, "The Spanish Armada."
4. Make a special study of the production and uses of cork.
5. On a map of Europe locate the most important cities of Spain and Portugal and learn for what industries or products each is noted.

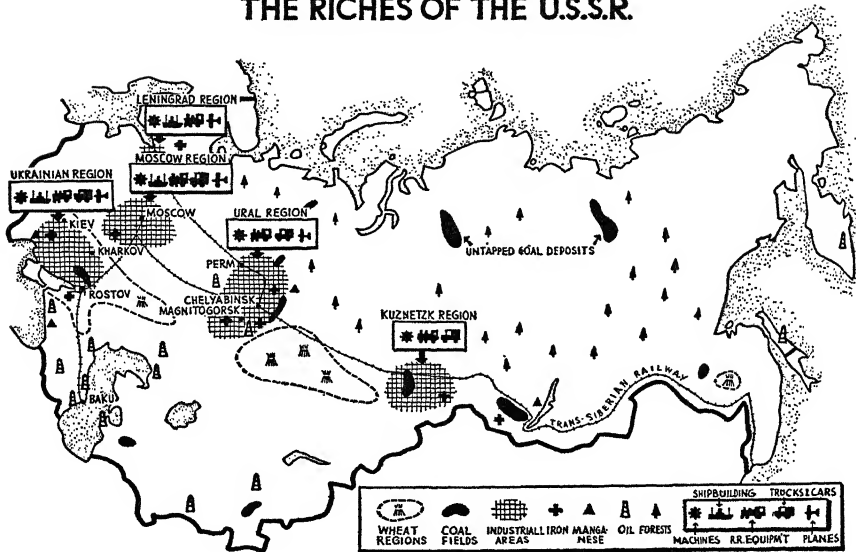
9. THE UNION OF SOVIET SOCIALIST REPUBLICS—A NATION WITH MUCH TO AVENGE

RUSSIA IN WORLD WAR II

Hitler's attack on Russia. You were told on page 152 of the peculiar circumstances that surrounded the Nazi attack on Russia. We will probably not know until the war is over whether it was Hitler's intuition that was at fault or the German high command erred in thinking that the Russian soldiers were no match for a Nazi army that was believed to be invincible. Almost two years before the invasion of Russia, September 1, 1939, Hitler had invaded Poland from the west. In the same month Russia had invaded the same country from the east. This seemed to indicate that the two aggressors were acting in concert. The attack on Poland brought Great Britain into the war against Germany. Hitler's attack on Russia gave Britain a staunch ally on the continent. As you read of the German army's advance study the map on page 153.

The battle has raged along the entire western boundary of Russia from the Arctic Ocean to the Black Sea. The main drives, however,

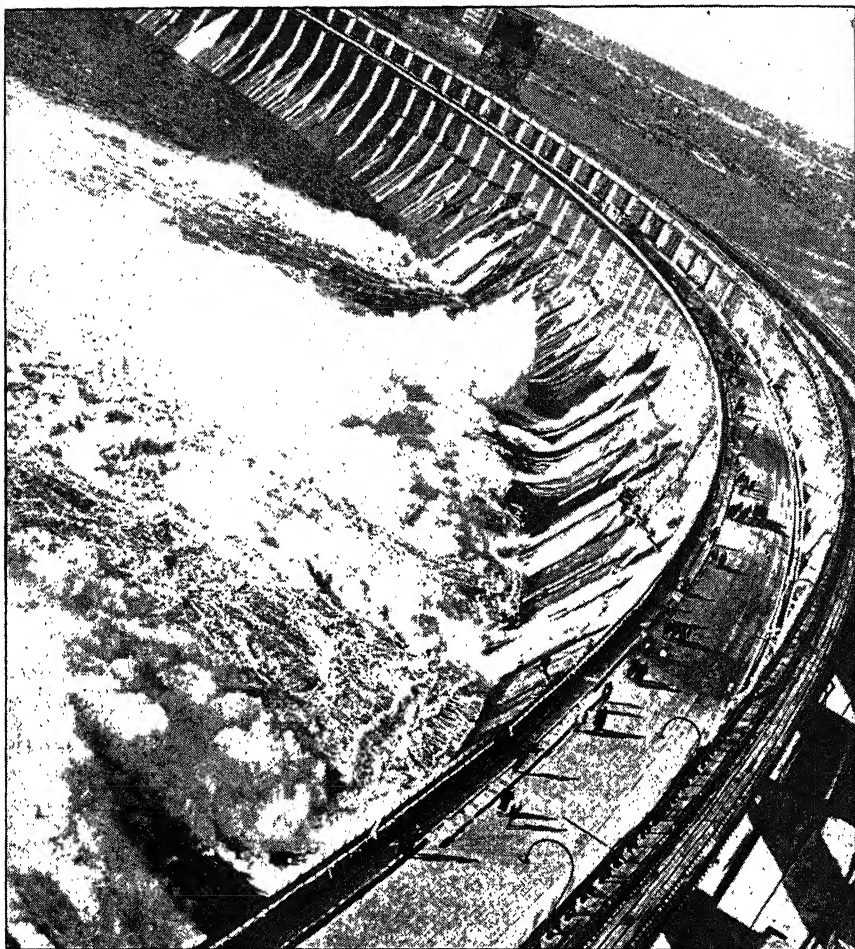
THE RICHES OF THE U.S.S.R.



were toward Leningrad on the north, toward Moscow in the center, and in the south into the Ukraine to capture Kiev, Kharkov, the Donetsk Basin, and the Black Sea ports, then on through the Caucasus to the Caspian and the oil fields of Baku. The advance in the north was aided by the Finns who joined Germany against the enemy who had so recently defeated them and taken large areas of their territory. Estonia, Latvia, and Lithuania, the countries previously reincorporated into the Russian domain, were soon overrun by the northern armies. The Germans wanted Leningrad because its capture would mean the cutting off of Russia's last outlet to the seas on the west and because it is an important commercial and industrial center.

The loss of any large center disrupts the communications running from it to all other parts of the country. Hence, the Germans wanted to capture Moscow, the capital and the greatest railroad center of Russia. That would inconvenience Russia greatly. All its great railroads including the Trans-Siberian have their terminals there. Moscow and its vicinity constitute one of the country's leading industrial centers. The capture of such a manufacturing region would handicap the country in supplying its armies with food, clothing, and munitions.

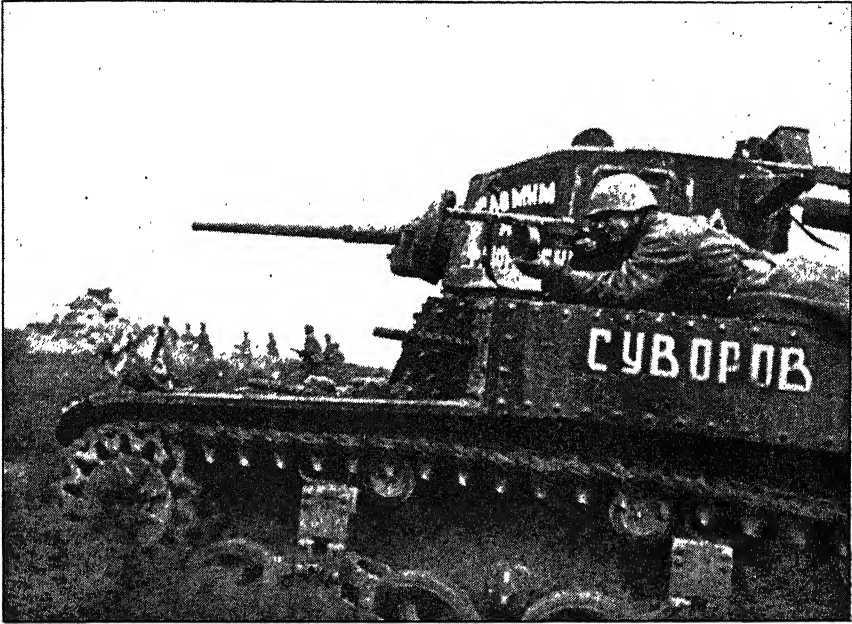
Along the southern front the Germans made their greatest advances. Kiev, a large manufacturing city, was captured, but the great dam at Dnepropetrovsk was blown up by the Russians before

*Sovfoto*

The Dnieper dam as it appeared before being destroyed by the Russians to prevent its being used by the Germans. Recent press reports indicate that the Germans, driven back by the Russians, have again destroyed it after having restored it.

the Germans took that city. Odessa, the great wheat port on the Black Sea, fell to Hitler's forces. This southern area is really the heart of Russia. The extensive plains of the Ukraine are the chief food-producing areas of the country, and the Donets Basin with its mines of coal and iron is a great industrial area which Russia could ill afford to lose. Near the southern tip of the Crimean Peninsula is Sebastopol, the port on which Russia's Black Sea fleet was based.

Although they met fierce resistance, the German armies pushed their drive relentlessly all along the long battle line. The Russians kept retreating but also kept carrying out Stalin's "scorched earth"

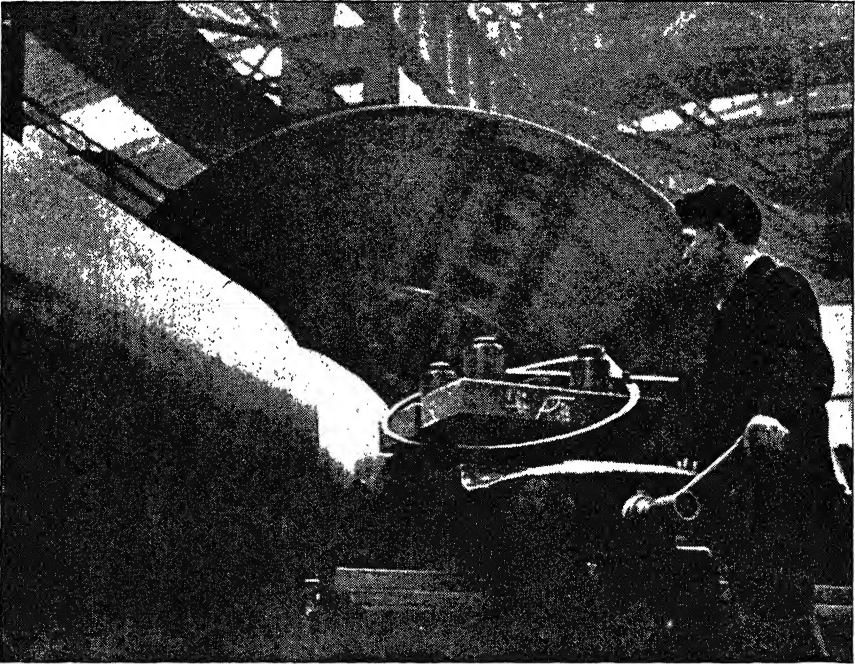
*Sovfoto*

Somewhere northwest of Stalingrad. Red army men with the support of American-built tanks dislodge the Germans from a strong position.

policy. Finally Hitler's forces were besieging Leningrad, Moscow, and Sevastopol. Hitler evidently thought the capture of these three cities would effectually end Russian resistance and their occupation would afford winter quarters for his armies. The rigors of winter and the determined resistance of Stalin's defending forces upset Hitler's timetable and late in November, 1941, the Russians began a counterattack along the entire front.

In 1942, however, after overrunning the Crimea the Germans captured the Russian naval base of Sevastopol. They then drove into the foothills of the Caucasus, captured Maikop with its oil fields, but did not reach the oil deposits at Grozny. They did not even come in sight of their goal, Baku, the center of one of the greatest oil fields of the world.

The German spearhead, however, extended nearly a thousand miles into Russian territory and altogether their armies occupied 700,000 square miles or nearly ten per cent of the country. This region was occupied by nearly 77,000,000 people many of whom were killed; others fled to sections of the country unoccupied by the Germans; and still others remained to drag out a miserable existence under German control.

*Sovfoto*

This workman is machining a heavy rolling-mill shaft at the Ural machine-building plant near Sverdlovsk. Much heavy industry has been developed in this region.

Three great cities, Leningrad, Moscow, and Stalingrad, held out against all German onslaughts. Leningrad withstood a long siege and Stalingrad was reduced to ruins. Moscow, the capital, was fanatically defended. The defense of Stalingrad was the turning point of the war. Gradually the Germans were driven from every foot of Russian soil, and the war carried into Germany itself.

America and Britain are aiding Russia for the purpose of defeating Hitler. American and British ships under convoy carry immense quantities of food, clothing, and war equipment to Russia. The routes followed are around the northern coast of Norway to the Murmansk Coast of Russia and around the southern tip of Africa or, since the successful campaigns in North Africa, through the Mediterranean Sea, the Suez Canal, and the Red Sea to the Persian Gulf. When Hitler is defeated by the combined forces of America, Britain, and the other Allies, the whole world will be freed from the menace which German ambition presents to every nation.

Up to the time of Russia's dauntless stand all along the eastern front, no one outside Russia had any conception of that country's strength. So quietly and so secretly had preparation for defense

been going on that it was felt that the country would prove an easy prey to Germany's armored might. This is no doubt what Hitler and his advisers thought; otherwise it is very unlikely that the Germans would have wasted their strength of men and equipment until they had realized their ambitions in the West.

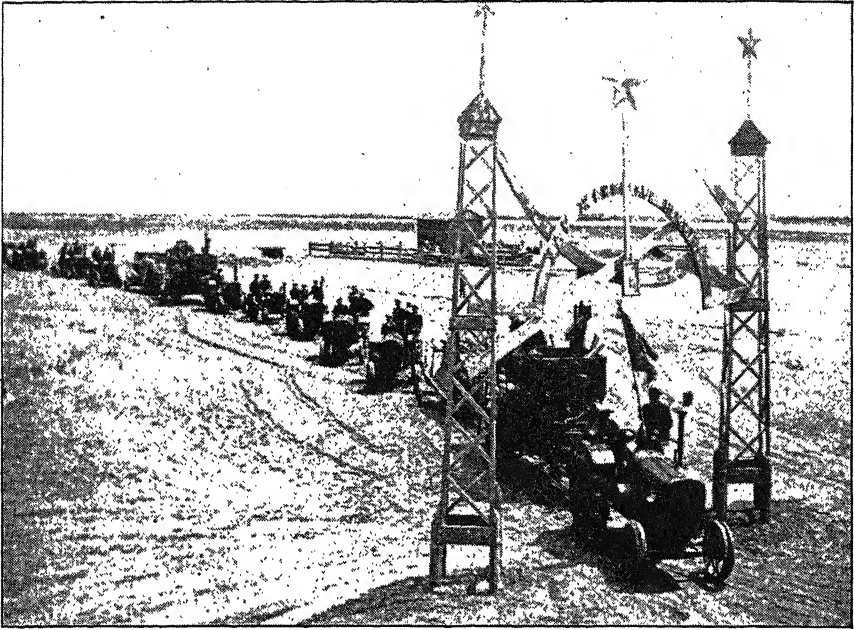
For years Russian leaders have been learning from western engineers and scientists. They had greatly increased their industrial output in all parts of the country. Their most strategic industrial centers were developed just to the east of the Urals where for ten years with feverish haste great steel plants were being installed regardless of cost in money and human life. This location has two advantages: it is surrounded by mineral deposits of various kinds, especially iron ore which gives its name to one of the leading manufacturing centers, Magnitogorsk (magnetite being an ore of iron); it is far removed from the battle front so that work in plants making planes, tanks, guns, and ammunition can go on even though the western part of the country is overrun by enemy forces.

The mineral resources of the Ural region and of central Siberia have hardly been tapped, but the use that has already been made of them has added greatly to Russia's strength and no doubt will play an increasingly large part in Russia's future industrial life.

SOVIET RUSSIA—AN EXPERIMENT IN GOVERNMENT AND INDUSTRY

Old and new Russia. Before the World War Russia was an absolute monarchy. The Czar ruled absolutely, and there was no popular self-government. The Revolution of 1917 led to the establishment of the present socialistic form of government. Under the Czars Russia's industries and commerce were very backward. The country's vast resources were undeveloped, and the people were poor and uneducated. The leaders of the Revolution, called *Communists*, have attempted to change all this. The new government took over all private productive property; so farms, forests, mines, factories, and railroads are now owned and operated by the state. To use these resources to the best advantage and to bring the country into line with progressive nations a Five-Year Plan was instituted.

The Five-Year Plan. The so-called Five-Year Plan which had been functioning tentatively for two years was put into operation in 1929. According to that plan certain objectives were to be accomplished in succeeding five-year periods. The first period extended from 1927 to 1932; the last from 1937 to 1942. Within the first five



Sovfoto

A file of tractors and combines leaving a machinery station for a day's work in the fields of a collective farm in the Kiev region of the Ukraine

years the program called for a fifty-five per cent increase in agricultural output and a one hundred and thirty-three per cent increase in industrial production.

Russia is a great agricultural country but the methods of farming at that time were primitive. No such increase was possible without machines. Russia had none and did not know how to make or how to use them. The Russians did not even know how to build the factories necessary to manufacture the machines. Engineers, some of them Americans, were brought in to show the people how to construct the buildings, how to install the machinery brought from America, how to manufacture the tractors, and how to operate them. It has been said that they had to build while learning and learn while building. Yet both the agricultural and industrial programs ran ahead of schedule. One new tractor plant with an annual capacity of 50,000 tractors was built in Stalingrad. It was one of the buildings that played so important a part in the 1943 siege of that great city.

Under the first Five-Year Plan the production of all basic commodities, such as coal, iron, oil, and gold, was also given goals of achievement. Neither were means of transportation overlooked. The construction of the Turkestan-Siberian Railway was a definite

achievement of that first period, as was that of the great Dnieper River Dam, the largest hydroelectric dam in Europe.

The wise foresight, the sound planning, and the masterly execution of these plans proved to be the salvation of the Russian nation. Instituted primarily for the betterment of the people, they proved themselves to be the mainstay of national defense. While the people of Russia have been greatly helped by contributions of food and war equipment from Britain and the United States, they have made notable contributions of their own. By the use of ski-tanks, ski-trucks, and ski-mounted guns they compelled the Nazis to keep on fighting during a second dreadful Russian winter.

What effect a third winter will have on the contending forces is not yet apparent, but the Russian counteroffensive seems more powerful than any offensive that the Germans have been able to deliver. Hitler's military might seems to have passed its peak while Russian strength has increased. The success of the United Nations' forces in North Africa, in Sicily, in Italy, and now in France and the Low Countries bodes ill for the German armies, for the opening of new fronts on the continent by the Allies have reduced the pressure on Russia and forced the Germans to fight on several fronts at the same time.

A country of two continents. Soviet Russia, or the U.S.S.R., now covers more than 8,000,000 square miles of land in Europe and Asia, with a population estimated at more than 190,000,000. Its area and population exceed the area and population of all North America. The immense size of Russia may be judged from the fact that it takes nine and one-half days to travel by train from Moscow to Vladivostok, Russian port on the Pacific side of the country.

Collective farms. The available farm land of Russia is enormous in extent. The black-earth region is a vast triangle of fertile prairie land with one side in central Europe and tapering to a point far eastward almost to Lake Baikal in the Eastern Siberian Region. More than half a million square miles of land is under cultivation, which is about one half as much as the cultivated area of the United States. Besides this there are large fertile areas in Asiatic Russia which when the Ukraine was overrun by the Germans were cultivated to provide food for the Russian people.

With such a vast agricultural empire it is only natural that Russia should produce enormous quantities of grains and other farm crops. The Soviet government has greatly increased agricultural yields by the use of farm machinery and by its policy of *collective* and *state*

farms. On the collective farm all workers share the expenses and also receive a share of the profits. The state farm is owned and operated by the government, and all workers are paid a small wage and are furnished living quarters. They are also given a small acreage to work for themselves. Although the total agricultural yields in Russia are large, the country is so vast and the population is so great that crop exports have always been small, with the exception of flax. Southeast of the good farm lands there are large areas known as *steppes*, where the rainfall is very light, the soils are poor, and grazing is the leading occupation. On its farms and grazing lands Russia has as many cattle, nearly as many hogs, and a great many more sheep than has the entire United States. In fact Russia ranks second among the countries of the world in the number of its domestic animals.

Forests and furs. Russia also has vast forest areas, especially in the northern Siberian Region. The lumber of this region can be taken down the Yenisei River to the Arctic Ocean and thence around to both European and Asiatic ports. A new city called Igarka has been built on this river to convert logs into lumber and to store them until the river opens for navigation in the summer. Before the war Russia's exports lumber and lumber products ranked first.

The forests contain many fur-bearing animals, and at Irbit, a small town just east of the Ural Mountains, a great fair (established in 1643) has been held each winter to which furs, wool, hides, and skins were brought from all parts of the country. Russia formerly supplied about one fourth of the world's furs. Squirrel, fox, ermine, sable, and marten furs are obtained in the forests. Persian lamb and karakul come from domestic animals. Silver foxes, minks, and rabbits are raised on animal farms.

Mines and mining. Minerals abound in Russia although many of the deposits have scarcely been touched. In the Donets Basin, for a time in German hands, there are great coal fields and considerable deposits of iron ore. This has been the leading iron and steel region of Russia, but now the coal and iron resources of Asiatic Russia are being rapidly developed. At Magnitogorsk in the Urals there are important deposits of iron ore and platinum. About fifteen hundred miles farther east there is a newly opened coal field of great extent. Ore is carried by rail east to the coal fields and there is smelted into pig iron. Coal is also taken back to the vicinity of the iron mines and used there in ironmaking. These great distances are a handicap to the Russian steel industry. New coal fields near Mag-



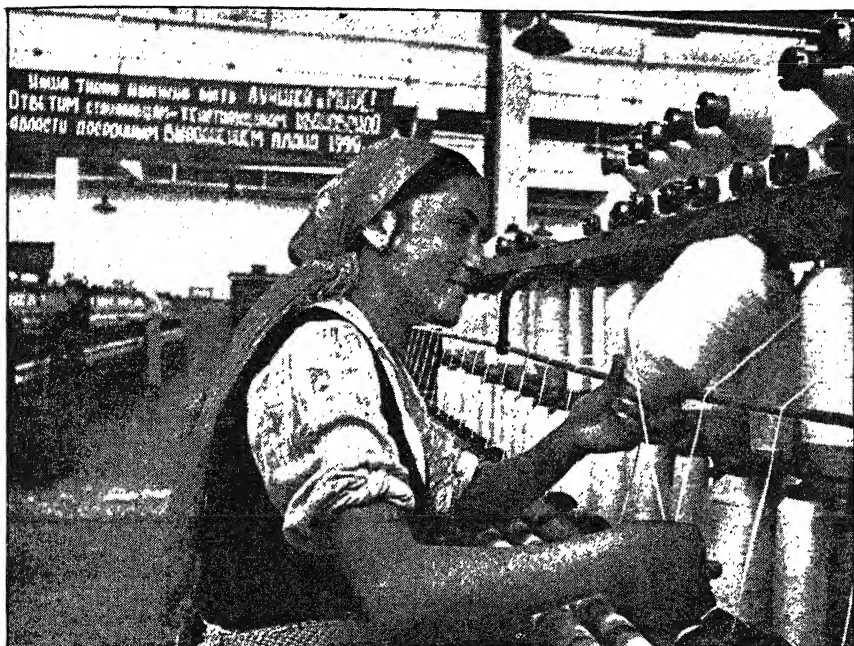
Sovfoto

Russian forests are fine hunting grounds. These two hunters have killed ten foxes and one bear. The fox skins may eventually find their way to America.

nitogorsk have since been opened and the long haul largely done away with. Increased machine building and improved transportation have encouraged a wider use of the country's mineral resources. Russia is also rich in manganese ore, a large amount of which has been imported into the United States for use in our steel mills. Asiatic Russia has valuable gold mines, the exact production of which is not definitely known, but which are being intensively worked by the Soviet government.

Petroleum. Russia was one of the first countries to produce petroleum on a large scale. The chief oil region is near Baku on the Caspian Sea. Pipe lines carry the crude oil more than 500 miles to the port of Batum on the Black Sea. This pipe line is built through a very rugged region and is one of the most costly projects of this kind ever constructed. A great deal of oil is used on river steamers, as fuel in factories, and in great refineries similar to those in our own country. Petroleum products have been exported in large quantities.

The Russian manufacturer goes to school. Next in importance to the heavy iron and steel industries in Russia is the manufacture of textiles. Russia has for years had a considerable cotton industry, and

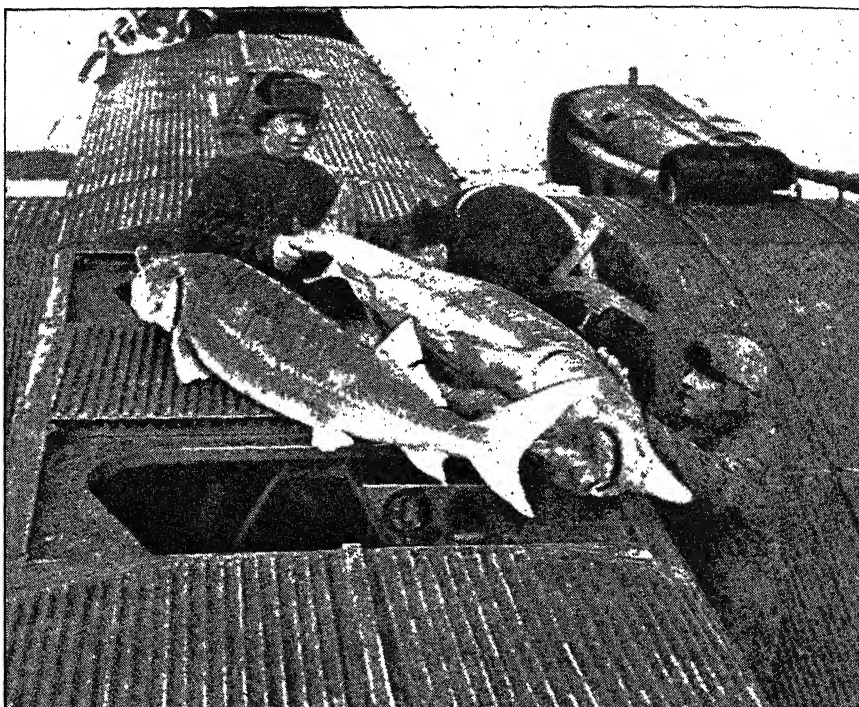


Sovfoto

A section of a spinning mill of the Stalin textile combine in Tashkent. This worker is said to overfulfill systematically the required production per worker.

the production of cotton goods was increasing as better methods were used and as the domestic market for these textiles improved. Recently rayon mills have been established and their production had already begun to appear among Russian exports. Russia has an abundance of wool for its mills as well as all the flax that it needs. Some cotton is raised in Asiatic Russia, but a large amount had to be imported from other countries. Cotton production is increasing, and less is being imported than formerly. The textile industries center in the region around Moscow, and the large population affords a great domestic market for both cotton and woolen goods. With the improved methods of manufacture and the resultant increase in production, Russia was exporting considerable quantities of textile goods.

Transportation speeds up. Transportation facilities in Russia are still very inadequate, but conditions are improving. As for roads and highways, the country is very poorly supplied. River transportation is hampered by many adverse conditions. The northern rivers are frozen for several months, and the level plains cause all Russian rivers to flow sluggishly and to have very shallow depths. The largest river of southern Russia, the Volga, flows into an inland

*Sovfoto*

Fish caught in the Caspian Sea are transported by air to Moscow, Leningrad, and other metropolises. Russia's development of aviation has been remarkable.

sea, with no outlet. Many of the rivers become very shallow as they flow into dry regions; so only vessels of light draft can be used. Nevertheless there is a large river traffic in the interior of the country. It is said that there are more than 3500 river ports in Russia and that more than 90,000,000 tons of freight are normally carried on the rivers every year. An increasing number of canals are being dug to improve this system of inland waterways.

Taken the country over the railroads are also very inadequate. The Trans-Siberian Railroad has been an expensive undertaking, but with the discovery and development of the resources of Siberia the road has proved itself a profitable investment and will eventually pay for itself many times over. Like everything else in Russia, however, this great transcontinental traffic artery is being improved constantly, and branches are being built to tap the rich agricultural and forest land along its route. The main line has been double-tracked from European Russia to Vladivostok.

Civil aviation has developed rapidly since its start in 1922. The total length of air lines is approximately 60,000 miles, including one

from Moscow to Vladivostok, the longest land line on the globe. Russian fliers are second to none in the world. They are noted for their skill, endurance, and courage. The Russian air force has played a notable part in the war with Germany.

Russian ports. The leading ports of Russia are Leningrad near the head of the Gulf of Bothnia, Odessa on the Black Sea, and Vladivostok on the Pacific Ocean side of Asiatic Russia. Archangel on the White Sea is being developed for use as a terminal of a route around the northern coast of Asia. This route is open for a few weeks in the summer and connects with steamers plying the rivers flowing across Siberia to the Arctic Ocean. All Russian ports are subject to certain disadvantages. Leningrad is closed by ice for several months; Odessa is a long way from the Atlantic; and Vladivostok is of no use for trade with Europe. This lack of sea-ports is a great handicap to Russia. For more than two hundred years Russia has been striving for a more accessible ice-free port than Murmansk which has played an active part in lend-lease operations. Russian history has centered around that struggle.

Asiatic Russia—a land of the future. There are great possibilities for development in Russia in Asia. The agricultural lands are of vast extent and are very fertile; the mineral wealth is enormous; the forests contain the greatest supply of lumber left in the world; and the grazing areas are very extensive. The population of this region is still small but is growing rapidly as the resources are developed. Branches of the Trans-Siberian Railroad are being ex-



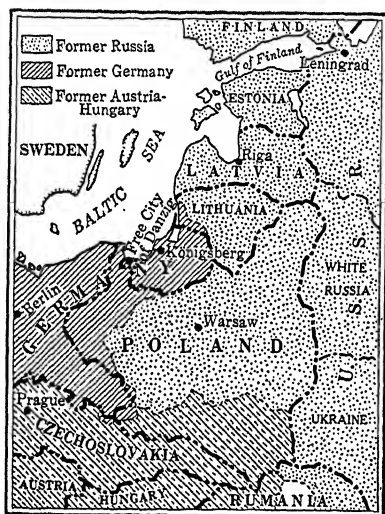
Soufoto

A native of Tadjikistan is block printing one of the colorful cotton prints that are used as bedspreads or wall hangings. This art is common in the Middle East and the products have found their way to America.

tended to make the products of this part of Russia more accessible, and improved transportation will make it very valuable. At present wheat, minerals, furs, and lumber are its chief products.

The southwestern part of Asiatic Russia, containing such Soviet republics as Uzbekistan, Turkmenistan, and Tadzhikistan, is a grazing and desert region noted for its cotton, wool, and astrakhan.

10. FINLAND AND THE BALTIC STATES—SMALL COUNTRIES WITH BIG PROBLEMS



New countries following World War I

Estonia, Latvia, and Lithuania are called the Baltic States because they all face the Baltic Sea. Together with Finland, which also has direct access to the Baltic, these states were formerly a part of Russia. But their people are not of the same race as the Russians, and at the end of the World War they became independent nations. Finland and Lithuania in particular had been great nations during earlier times, and their general level of educational and cultural development was much higher than that of Russia. All four of these small countries have the advantage of direct access to the sea, and their loss was a great blow to the maritime power of Russia. Russia also lost valuable resources in the Baltic region. Forests abound in all these states, and lumber, pulp, and paper have been exported. Rye and flax are prominent agricultural crops, and dairy cattle thrive. Much grain, butter, and meat were exported. Coöperative farming and marketing societies are highly developed in Finland. The exports went mostly to western Europe although wood pulp came to the United States. Manufactured goods have been the chief imports of the Baltic States.

World War II comes to Finland and the Baltic States. Soon after the defeat of Poland and the division of its territory by Russia and Germany, Russia made demands upon Finland for the transfer of portions of Finnish territory to Russia and the granting of certain



Photo from ips-Hollywood

Logs in a river of Finland. Much of the country is covered with evergreen forests. Lumbering is one of Finland's leading occupations.

rights to Russia. Because of Finland's refusal Russia declared war upon Finland, and after several months of warfare the Finns were obliged to yield to Russia's demands. Large areas in the southern and eastern parts of Finland were ceded to Russia, together with some islands in the Gulf of Finland. The Russian government felt that ownership of these lands and the right to fortify others were necessary to protect it from attacks from the northwest. •

At about the same time that the Russian government began to exert pressure upon Finland, similar demands were made on Estonia, Latvia, and Lithuania. These three countries met Russia's terms, thinking they might thereby retain their independence. But in a short time these small countries were overrun by Soviet soldiers, and in each case the country again became a part of the Soviet Republic. No doubt Russia's purpose in seizing them was based more largely on their strategic position in case of war than because of their resources. Dictators have no confidence in one another; hence, Stalin doubtless thought that he had better annex the three states to his

domain before Hitler had a chance to do so. Soon after Hitler's attack on Russia all the Baltic States were invaded by the German armies and were for some time under German control. Finland was not invaded but voluntarily entered the war on the side of Germany. As a result of Russian successes the Finns were finally forced to aid in the expulsion of the Germans.

GUIDES TO STUDY

1. What had been the relations of Germany and Russia for the few years previous to June 22, 1941? (See p. 152.)
2. How did the apparently friendly relations between the two countries serve Russia's purpose?
3. With the outbreak of the war what very important cities did Hitler's armies try to capture? Why?
4. What was the extent of Hitler's drive into Russia? What large cities were taken? (See map, p. 153.)
5. What help has Russia received from the United States and Britain? Why do these countries send aid to Russia?
6. What preparations had Russia made to meet just such an attack as the Germans made?
7. Why did the Russians move some of their great industrial plants to the Ural region? What resources and advantages does the Ural region possess?
8. What portion of the areas of Russia conquered by the Germans have been retaken by Stalin's armies?
9. Why is modern Russia more progressive than the country was under the monarchy?
10. What steps did Russia take to manufacture its own farm machines?
11. What other great advances have been made in industry and transportation?
12. How is collective farming carried on?
13. What use is made of the steppes? Why?
14. What use does Russia make of its forests?
15. Where are Russia's greatest mineral resources? How do they aid in the country's industrial development?
16. What are some of the country's advantages for manufacturing?
17. Why are the transportation problems more difficult than those of many other countries?
18. For centuries Russia had been struggling for ocean ports. Why was this necessary?
19. Asiatic Russia promises much for the future. Why?
20. Why did Finland fight Russia?

TOPICS FOR CLASS DISCUSSION

1. What Hitler sought in Russia.
2. Winter comes to Russia's aid.
3. Russia's great petroleum fields.

4. Allied aid to Russia; the routes followed.
5. Development of the Ural region.
6. The Trans-Siberian Railroad.
7. Resources of Asiatic Russia.
8. Russia's need of open ports.
9. Russia and the Japanese.
10. The Russia of tomorrow.

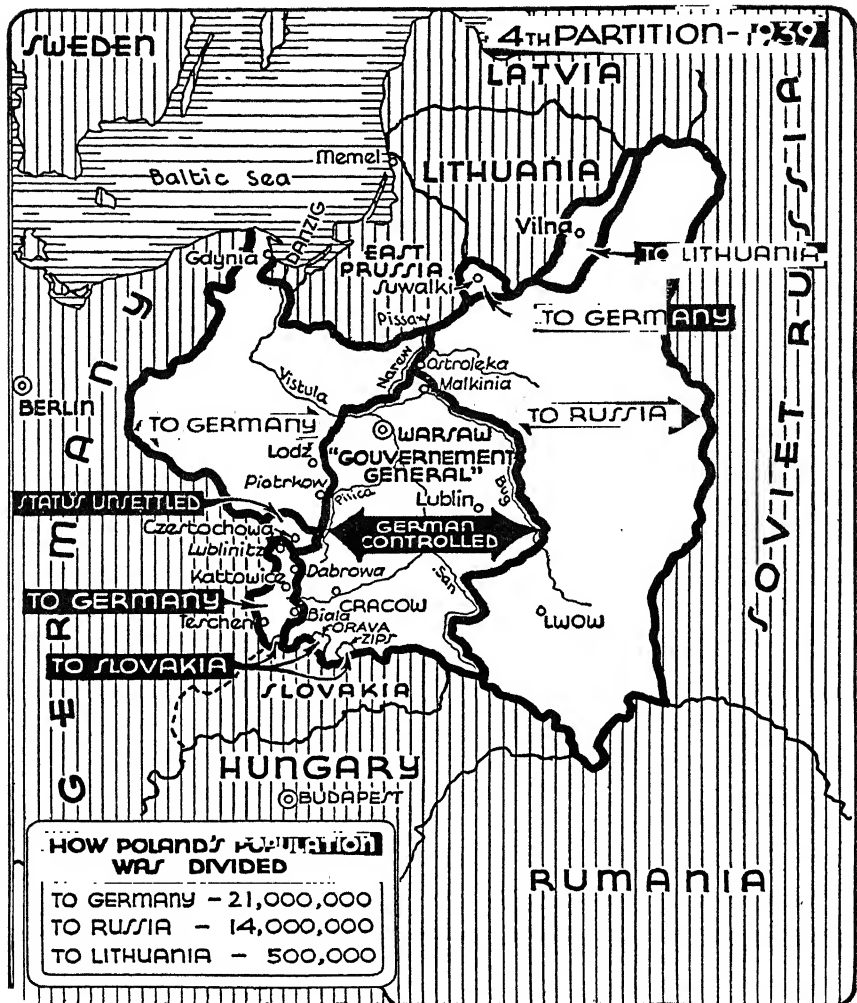
WORK TO BE DONE

1. Appoint a committee to gather information concerning Russian methods of agriculture and industry.
2. Making use of the statistics in the Appendix and in reference books, make graphs comparing Russia with other leading countries in area, in population, in yield of chief crops, in production of minerals, and in value of its peacetime commerce.
3. Make a list of Russian accomplishments and draw a conclusion concerning the progress made in the past twenty years.
4. Draw an outline map of Russia. On it locate the chief agricultural regions, showing the crops raised, the principal mineral deposits, and the leading industrial and commercial cities. Trace also the longest rivers and print names of bordering waters.
5. On an outline map of Asia trace and name the largest rivers of Siberia. Trace the route followed by the Trans-Siberian Railroad. Locate and learn the importance of the cities of the region.
6. Study and report to the class the resources and industries of Finland and the Baltic States. What has been the history of these countries since the end of World War I?

11. CENTRAL EUROPE AND THE BALKANS—AXIS-DOMINATED COUNTRIES

POLAND

Poland is destroyed. One of the provisions of the Treaty of Versailles was the restoration of Poland with the establishment of the Polish corridor to give it access to the Baltic Sea. Unfortunately the corridor separated East Prussia from the rest of Germany. Moreover, a large part of the reorganized Poland consisted of territory which had been under German control for about one hundred twenty-five years. To make matters worse Danzig, once a German port, was internationalized so that it could be used by the Poles as well as by the Germans. When the Poles refused to surrender their rights in Danzig and to cede a part of the Polish corridor to Germany, Hitler ordered his armies into Poland, September 1, 1939. Later in the month Russian troops entered Poland from the east. So



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quickly was Polish resistance overcome that before the first of October Poland was completely under the domination of its enemies. Previous to this time the Germans, not satisfied with the annexation of the Sudeten Lands, had marched their armies through the northern sections of Czechoslovakia and had proclaimed the whole of that country as either directly or indirectly under German control. The advantages gained by securing a hold on Czechoslovakia was that a possible enemy was thus eliminated and opportunity was also given for attacking Poland from the south, if necessary, as well as from the west.

The destruction of Poland was almost complete. Its cities were leveled by bombing; factories were either destroyed or their equipment removed; agricultural lands were overrun; and farm machinery destroyed. Many Poles were forced to leave the country to work in the fields and factories of Germany. It was Hitler's purpose to gather all Polish Jews in an area of central Poland between the German and Russian areas. What the future of Poland will be no one can say. Much will depend on how long the war lasts. It was clearly Hitler's intention that Poland as a country should cease to exist. If his purpose were to be accomplished, then Polish resources would simply add to the wealth of Germany, and what is left of the Polish people would be widely scattered. As in the case of the other countries overrun, another potential enemy was removed from the field and the way cleared for approach to Russia. No doubt it was Hitler's ambition to add to German farm lands many square miles of territory on which great quantities of food might be grown to feed the enlarged German nation. To these may be added forests and minerals, all of which are needed to maintain Germany's industries.

A land of many resources. Poland is in the great European lowland and has a climate generally suited for agriculture. Seventy-five per cent of its workers were employed on farms and nearly one half of the land was cultivated. The leading crops were grains, potatoes, and sugar beets.

Forests cover nearly one quarter of Poland's area. Lumber and wood pulp were produced in amounts sufficient for home consumption, and forest products were the largest single item of export.

Poland is very rich in minerals. The country has coal, lead, and zinc and some iron ore. Poland had the third largest petroleum production in Europe, the largest salt deposit in the world, and some potash.

Industrial development. The greatest industrial region was in the southwest, where minerals and fuels made iron and steel manufacturing possible. In the northwest there were sugar mills, gristmills, breweries, and mills for the manufacture of starch, potato flour, and other food products. The textile industry led all others, with Łódź and Warsaw (Warszawa) as important centers. Most of the raw cotton came from the United States. Leather, paper, and chemicals were produced from Poland's own raw materials.

Poland's location in Europe midway between the industrial west and the agricultural east favored its international-trade relations. However, Poland was a *buffer state* between Russia and Germany

and was thus in a dangerous position on account of the absence of natural barriers at the borders.

Poland had good railroad connections with the important markets of Europe. The Vistula is a good inland waterway. The Polish corridor gave the new nation an outlet to the Baltic Sea. Danzig at the mouth of the Vistula had been made a *free port* so that Poland might send its exports out that way; but Poland had built its own port at Gdynia on the shore of the Polish corridor some distance from Danzig. This port of Gdynia became an important trade center. With its great resources, large population, and excellent location Poland had good prospects for future development and increasing strength among European powers.

CZECHOSLOVAKIA

Czechoslovakia brought under German control. Even before the defeat of Poland, Czechoslovakia, a nation created at the close of World War I, had been brought under German domination. This had come about because England and France had weakened when Hitler threatened to attack those countries if his plans were thwarted. Hoping to save themselves from ruthless attack by the greatly superior German air force, they advised the Czechs to submit to Hitler's demands. Since it was useless for Czechoslovakia to engage in war with the mighty German armies without the support of Britain and France, the Czechs could only stand idly by while German tanks, cannon, and soldier-laden trucks rolled over the country's highways and through the streets of the capital city and German airplanes droned overhead.

Germany's gain in Czechoslovakia. The winning of a bloodless victory over Czechoslovakia was a victory indeed. Almost no other of the conquered countries brought within the German grasp resources so rich and varied or industries so necessary to a country at war. Its rich agricultural lands added greatly to Germany's food supplies and thus helped maintain a large armed force. Its industries supplied by Czechoslovakia's own resources of coal, iron, agricultural products, and forest products did much to insure full military equipment. The great Skoda munition works, one of the most efficient in the world, passed to German control. Had it been deemed best for the Czechs to defend these resources and industries, no doubt many of them would have been destroyed.

Factors that made invasion easy. Czechoslovakia is essentially

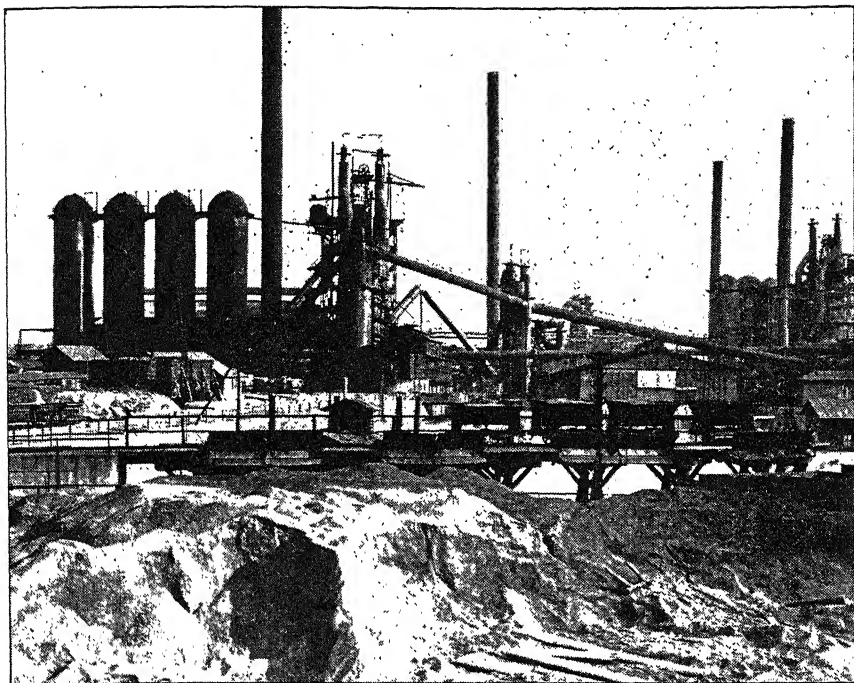


Photo by James Sawders

Steel furnace and piles of iron ore. These plants are the largest steel and iron works in the country. The region was known as the "Ruhr of Czechoslovakia." Why? No doubt these plants have been of great use to the Germans.

a Slavic nation, yet its population includes several different races. In the western part of the country live the Czechs; in the eastern highlands live the Slovaks having a background and culture quite different from that of the Czechs. However, both Czechs and Slovaks worked together fairly well to make a real democracy of their nation. The chief difficulty was the presence in the country of large numbers of people of other nationalities, particularly Germans, of whom there were more than 3,000,000 in Bohemia. There were also many Poles and Hungarians, besides Jews and Ruthenians. The minority peoples had long felt dissatisfied with Czech rule. The dissatisfaction of the Germans, Poles, and Hungarians steadily increased. Their antagonism toward the Czech government was encouraged by the attitude of their home governments. Finally, the pressure of these bordering nations upon the government of Czechoslovakia became so great that in 1938 it was compelled to cede considerable areas to Germany, Poland, and Hungary.

Except for the Czechs and the Slovaks it was from beginning to end a nation "divided against itself" and thereby "brought to deso-

lation," an easy prey to German might. Its government is in exile in London.

HUNGARY AND RUMANIA

Hungary was closely in sympathy with the German movement. With the support of Germany Hungary compelled Rumania to restore Transylvania which had been ceded to Rumania by Hungary by the Treaty of Versailles. Germany took advantage of its aid to Hungary by greatly increasing its authority in that country, by marching troops over its territory, and by assuming almost absolute control of transportation on the Danube River. Control of Hungary gave Hitler great advantages. The country produces much grain, potatoes, and sugar beets, valuable additions to Hitler's resources. Of even greater importance are large deposits of bauxite, said to be among the richest in the world. These are vital for war, for aluminum of which bauxite is the ore is absolutely necessary in making airplanes. Hungary produces some coal and petroleum, both of which are badly needed by a country at war.

Since Hitler's plan was to rule all of Europe, you will see by looking at a map that the union of interests with Hungary greatly extended German control toward the south and increased the possible lines of attack on Yugoslavia and Rumania.

Not only was Rumania compelled to relinquish territory to Hungary, but about the same time it was obliged to cede Bessarabia to Russia and another portion of its territory in the southeast to Bulgaria. These losses of territory were followed by uprisings within the country which greatly weakened the government. Taking advantage of that country's misfortunes, Hitler's government compelled Rumania to sign a treaty which practically placed all of the country's resources and industries under German control. Looking again at a map, you will note the great extent of territory brought under Hitler's domination without his fighting for it. This territory included Austria, Czechoslovakia, Hungary, and Rumania.

Rumania was a plum upon which Hitler had long had his eyes and which he intended to pick at the first opportunity. It almost fell into his lap. The richness of this prize consisted largely of Rumania's oil wells which for months had been supplying Germany's airplanes, tanks, and trucks with much of their petroleum supplies, without which his airplanes would have been grounded and his tanks stalled. Hitler saw to it that these wells did not fall into the hands of his enemies. By possessing them he thought that he could defend

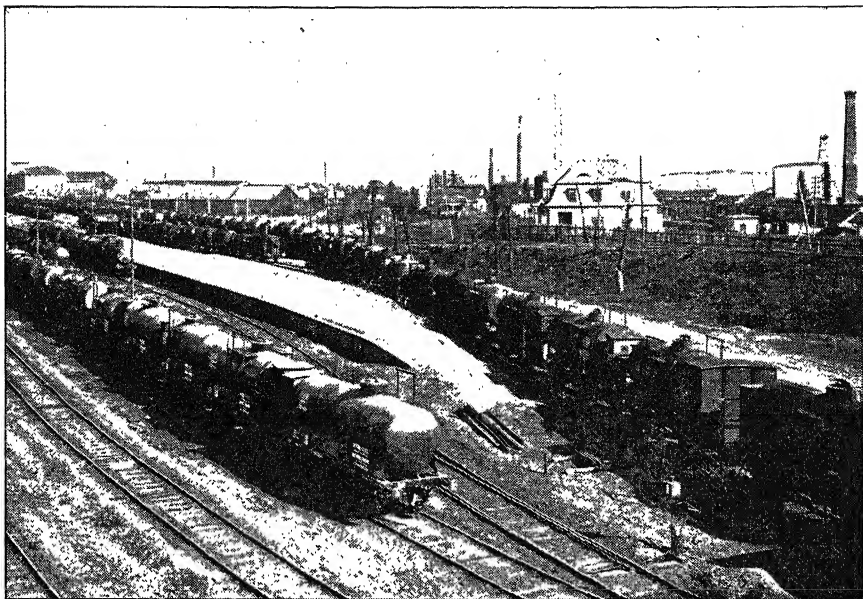


Photo by James Sawders

Oil refineries at Ploesti in Rumania. Tank cars are used to distribute the oil to surrounding regions. These plants have been partially destroyed by bombings by an American Air Force from North Africa.

them from destruction. However, an allied air force was able by a surprise attack to do great damage to the oil plants in August, 1943. In addition to oil Rumania produced large quantities of grain which could be used to feed German armies sent into or across the country. In case of necessity these foodstuffs could be sent to Germany. Control of Rumania, as indeed was true of each new country, made sure to Hitler that that country would not turn against him, neither could it ally itself with another country which might prove later to be an enemy.

Control of Rumania gave Hitler another advantage which no other country gave; namely, access to the Black Sea and control of the mouth of the Danube. When the Russians drove the Germans from Rumania in the latter part of 1944 the Germans lost control of that great highway. They also were deprived of the use of the oil wells and the rich grain fields of the Rumanian plains.

BALKAN COUNTRIES

A land of many races. The Balkan Peninsula is that part of Europe south of the Danube and Drava Rivers. Yugoslavia, Bul-



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garia, Albania, Greece, and parts of Turkey and Rumania occupy this area. It is a region of rugged mountains and hostile races. These mountains have tended to keep the different races isolated from one another, and so they have remained hostile instead of becoming united. The result has been frequent warfare, and, with the exception of Greece, very little cultural or commercial development.

Importance of the Balkans. The Balkan Peninsula is crossed by three great trade routes. The first of these extends from Istanbul

(Constantinople) on the Bosphorus up through Belgrade (Beograd), Vienna (Wien), and Prague (Praha) to Berlin. This is the direct railroad route from northwest Europe to Asia. The second route is the water route from the Mediterranean and Aegean Seas into the Black Sea and thence into Russia. The third route is down the Danube River into the Black Sea and thence either into Russia or out into the Mediterranean. The great Berlin to Istanbul railroad lines pass through several Balkan countries, which makes peace in these countries important to the rest of Europe. Otherwise the Balkan States are of little importance. They have little mineral wealth, the forests are not especially valuable, and good farming land is scarce. Production, trade, and culture are all backward.

GREECE

Past glory. While Greece has had a great and glorious past, it had little to tempt the Axis in the way of accumulated wealth or the prospect of future exploitation. What it had to give to the world, it had already given in the form of art, architecture, literature, and philosophy—things of the spirit. All the world is the richer for those priceless gifts. Today Greece is a poor agricultural country. All that it has left are its monuments, the tradition of its former glory, and its valor. Its repulse and near rout of the Italians, its second valiant stand at the Pass of Thermopylae prove that the Greek is still endowed with Spartan courage.

Traditions upheld. Like all the other occupied countries it was occupied but not conquered. There was a strong underground movement there and guerilla warfare went on unceasingly. Its exiled government worked with the Allies until the Germans were driven out and freedom restored. Its navy is in the service of the Allied fleet. Greek culture will survive because it is of the spirit—a wealth that cannot be stolen.

YUGOSLAVIA AND BULGARIA

Extension of Axis domination. While Germany had been extending its influence rapidly to the south in the Balkans, Italy had been carrying on an unsuccessful war against Greece, which was aided by British troops and British equipment. The outlook for Italy in the Balkans was far from bright. The easiest routes for its Axis partner, Hitler, to bring assistance was through the valleys and passes of Yugoslavia and Bulgaria. Bulgaria was in sympathy with the Axis

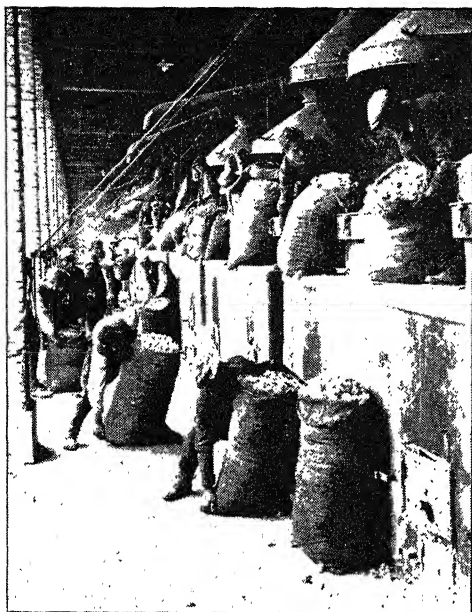


Photo by James Sawyers

Bags of rose petals become bottles of perfume. This factory in southern Bulgaria uses 2750 tons of roses and produces a little more than half a ton of rose oil.

and offered no resistance. Because Yugoslavia dared to resist, it was bombed unmercifully. The German forces conquered the Greeks and forced the British out of the country. This German victory brought practically the whole of the Balkan region under German control.

Albania being a protectorate of Italy, the Axis partner, was of course not molested. So European Turkey remained the only part of the Balkans not subject to German domination. Yugoslavia, Bulgaria, and Greece are all poor countries, and Germany had little to gain from their re-

sources. Yugoslavia has considerable deposits of coal, iron, and copper and small quantities of bauxite and chromium. These have not been extensively mined by the people of Yugoslavia, since they have given their attention largely to agriculture. Bulgaria produces tobacco much of which has been exported to Germany.

But far more important to Germany than the mineral resources and farm products of these countries was the possession of a direct route toward the Suez Canal, a part of Britain's life line to India and the Far East. Had it not been for the Allied forces, the Germans could have crossed the Aegean and Mediterranean Seas (see Pl. 6, 7) to Syria. In this way the route would be opened to the oil fields of Iraq and Iran if the opposition of British and Russian land and air forces could be overcome. Control of these oil wells would deprive the British of supplies from these regions and at the same time give the Germans the fuel needed for operating in this part of the world. Whether the Germans moved eastward by way of the Suez Canal or by way of Syria and Iraq, they would be approaching Britain's most valued possession, India. Even before World War I it was Germany's dream to complete a railroad from Berlin to Baghdad. This

road since completed from Germany to the Persian Gulf would if fully under German control have opened up to the Germans the marvelously rich flood plains of the Tigris and Euphrates Rivers and the oil fields of Iraq and Iran, and at the same time it would have opened the way through the Persian Gulf and the Arabian Sea to the wealth of the Indies (see Pl. 7) and made possible a union of the Germans with the Japanese forces in the Far East.

GUIDES TO STUDY

1. What reasons had Hitler for invading Poland? What were the results of the invasion by German and Russian armies?
2. What were Poland's chief resources?
3. What natural resources were the foundation of its industries?
4. How did Poland's location favor its trade relations?
5. How did it have access to the sea?
6. What were the causes of Czechoslovakia's downfall?
7. What did Germany gain in its acquisition of Czechoslovakia?
8. What conditions made the German invasion of Czechoslovakia easy?
9. How were Hungary and Rumania brought under German control?
10. What valuable resources fell into Hitler's hands in Hungary and Rumania?
11. What important transportation routes pass through the Balkans?
12. How did the Greece of past centuries differ from the Greece of today?
13. What physical features and resources made Yugoslavia seem a desirable region for German conquest?

TOPICS FOR CLASS DISCUSSION

1. Hitler's aims in Poland.
2. Czechoslovakia, the most progressive of the "new countries" of Europe.
3. Acquisition without fighting.
4. The Balkan countries—the tinder box of Europe.
5. Routes to the Suez and the Far East.

WORK TO BE DONE

1. In Washington, D.C., are statues erected in honor of two Poles, Pulaski and Kosciusko. Why were these men so honored?
2. On an outline map of Europe print the names of all the countries of Central Europe and the Balkan region. Print the names of large rivers and important cities. What is the value of these rivers for commerce as compared with the rivers of Western Europe? Give reasons for the importance of each of the larger cities.
3. Read newspapers and magazines to learn how racial differences affect the peace and progress of these countries.
4. Find out on which side the different Balkan countries fought in World War I.
5. Study newspapers and magazines to learn how patriots in the Balkans are striving to free their countries from the control of the German enemy.

PART FIVE. ASIA—A WORLD PROBLEM

UNIT XVII. LANDS WITH CONFLICTING INTERESTS

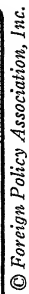


Sovfoto

A convoy of American trucks, carrying Allied aid for Russia, on their eight-day journey northward to the Soviet Union from a Persian Gulf port

1. THE NEAR EAST—A CONVEYOR BELT FOR LEND-LEASE TO RUSSIA

Where East meets West. That portion of southwestern Asia lying south of Europe and separated from it by the Black and Caspian Seas and the Caucasus Mountains is usually spoken of as the *Near East*. The political map of the region has undergone many changes. Empires have risen and fallen, boundaries have changed, and old countries have given way to new or to new forms of government. The present map of the area comprises Turkey, Saudi Arabia, Palestine, Trans-Jordan, Syria, Iraq (Mesopotamia), Iran (Persia), and



Map of the Near East showing oil fields, pipe lines, and railroads

Afghanistan. Saudi Arabia and Iraq are nominally independent but under strong British influence; Palestine is mandated to Great Britain as Syria was to France; Turkey, Iran, and Afghanistan are independent.

Ancient glory. In this region were cradled the oldest civilizations of the world. Our present arts and architecture, science and literature, religious and civic ideals all had their beginnings in these faraway lands. The study of the stars by the nomads and the shepherds led to the science of astronomy. The problem of providing food in the desert led to the development of irrigation. To the Arab we are indebted for our system of numbers and possibly for our alphabet. The natives of this region were probably the first to make use of the horse and wheeled vehicles. From Palestine (the Holy Land) came the Jewish and Christian religions. Mecca, in Arabia, toward which millions of faithful Mohammedans turn in their daily devotions was the birthplace of Mohammed, the founder of their faith. Bethlehem in Palestine was the birthplace of Jesus.

From the ship of the desert to airships. Caravan routes radiating from this center in all directions gave the region much of its early importance. When the water route around the Cape of Good Hope was discovered, much of this trade was diverted to that route. Many years later the opening of the Suez Canal all but ended this picturesque mode of trade and travel. Not many railroad lines have been built. The use of the automobile reduced the importance of the camel as a beast of burden; and now the airplane makes this animal almost useless.

Present decline. This region has had a great past, but it is now decadent. Living conditions are hard. Much of the country is desert. Farming is carried on mainly on the flood plains of the river valleys, in oases of the desert, or on a few coastal margins where there is a slight rainfall. Although the climate is hot and dry in the uplands, the nights are cold. Many of the people have been and still are keepers of sheep. Since many of the people are nomadic rather than dwellers in fixed habitations there are few large towns or cities. The global war has brought many problems to the Near East.

TURKEY

The New Turkey. Turkey, which once occupied all the Balkan peninsula and a large part of Asia Minor, dominated this region for centuries. Its rule was one long story of political corruption. At

*Photo by James Savaders*

Istanbul (Constantinople), Turkey. The land across the Bosphorus is in Asiatic Turkey.

the present time Turkey is confined almost wholly to the peninsula once known as Asia Minor. A small European area about the size of Maryland at the southeastern end of the Balkan Peninsula remains in Turkish possession. While this region is not important productively, it contains the great city of Istanbul (Constantinople, the former capital), which is the terminus of the railroad across central and southeastern Europe. The control of this small area is therefore of great commercial and military value.

Under the influence of the Young Turk, Turkey has undergone a political and social awakening. A fine capital has been built at Ankara (Angora) at a cost of \$100,000,000. Western methods have been adopted and a republican form of government has been established. Slavery and polygamy have been abolished, women have been enfranchised, and education has been improved.

Agriculture. Farming and grazing are the chief industries. Tobacco is the chief crop. Turkish cigars and cigarettes have long been an important article of commerce in world trade. Raisins, Smyrna figs, nuts, and fruits are exported in large quantities when possible. Cotton and cereals are grown extensively. Some cotton was exported to Mediterranean countries before the war. The rais-



Photo from Triangle Photo Service

Tel Aviv is a city of modern architecture, parks, and playgrounds in an old world setting.

ing of livestock is also important. Horses, mules, and camels are used as beasts of burden. Large flocks of sheep and goats are kept for their wool and mohair. These fibers are woven into the famous Turkish rugs and carpets, and camel's hair is also used for blankets and coats. Much of the rug weaving is done on hand looms in the home following patterns that have been used for centuries. American manufacturers are now copying the designs and making so-called American Orientals on power looms. In peace times Istanbul is the center of the Oriental rug trade.

Minerals. Turkey has extensive mineral resources. Chrome ore, zinc, antimony, manganese, and copper are the chief ores. Meerschau, a soft mineral used in the manufacture of the well-known pipe of that name, is mined here.

Turkey's place in the war. On account of its position across the narrow Dardanelles from Europe and on the shores of the Black Sea, Turkey is a very vital spot in the struggle for the oil resources of the Near East and the Caucasus region. Its minerals are also greatly desired by both the Axis and the Allies. Up to March 1, 1945 the Turkish government kept itself neutral in the great conflict; but

in order to have a seat at the peace table, it declared war on Germany and Japan on that date. Turkey had developed a strong army for so small a state and was said to be ready to block any attempt to invade its territory by any power which it considered unfriendly. The United States has always enjoyed the confidence of the new Turkish government.

PALESTINE

The "promised land." This country has again become a refuge for many of the Jews persecuted and driven from central and eastern Europe. There, with aid sent by the more fortunate members of their race in other lands, they are cultivating the soil, scientifically developing manufactures, and making use of the water power of the Jordan and of the oil brought by pipe line from Iraq. The city of Tel-Aviv is the leading Jewish center of industry and trade. The Arabs object strongly to Jewish immigration because they feel that the country and its resources belong to them and that the immigrants are usurping their rights. This presents a serious problem to Britain whose business it is to see that order is maintained.

IRAQ

Iraq, the Arab name for Mesopotamia, lies in the extraordinarily fertile valleys of the Tigris and Euphrates Rivers. Engineers estimate that the combined waters of the two rivers could irrigate 7,000,000 acres of land in the winter and 3,000,000 acres in the summer. Irrigation projects were developed here in very early times. Later the region was overrun by Mongols and Turks who destroyed the irrigation systems and turned the region into pasture land for their flocks and herds. Under British influence and with British capital these irrigation systems are now being gradually rebuilt and the region may once again repeat its great productivity.

There is a great range of temperature here, varying from 120° in the summer to frosts in the winter. The greater part of the region is low and very unhealthful. The chief crops are wheat, barley, rice, and millet. Some tobacco is grown. On the tidal stretches of the rivers there are extensive groves of the date palm. In the north where it is cooler, sheep are raised and wool and skins are exported in normal times.

Riches in petroleum. Iraq produces oil near Mosul. Nearly all the oil fields are controlled by the British, with pipe lines carrying

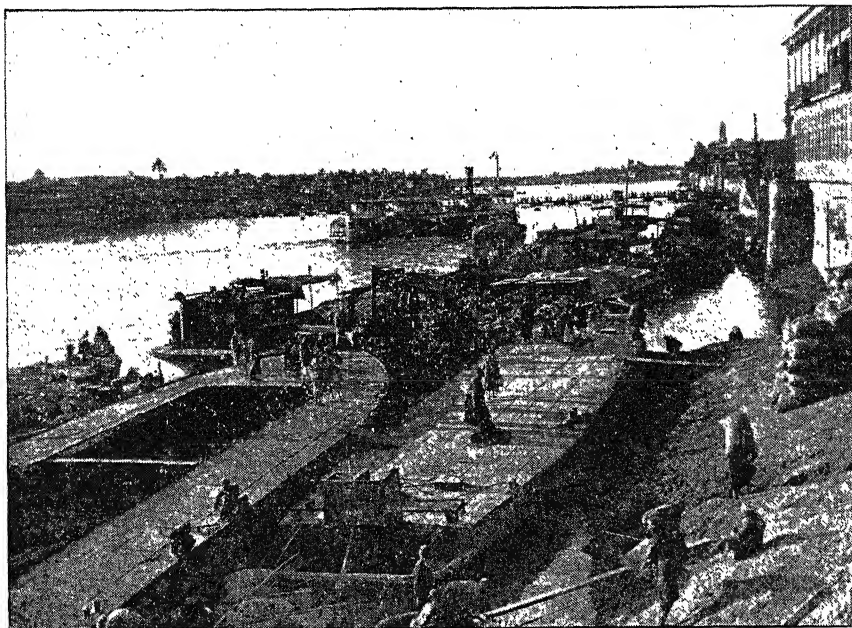


Photo by James Sawders

The port of Baghdad on the Tigris River. Barges are being loaded with grain, bales of cotton, rugs, and hides—the exports of the country. The barges take these products to Basra where they are transferred to ocean-going ships.

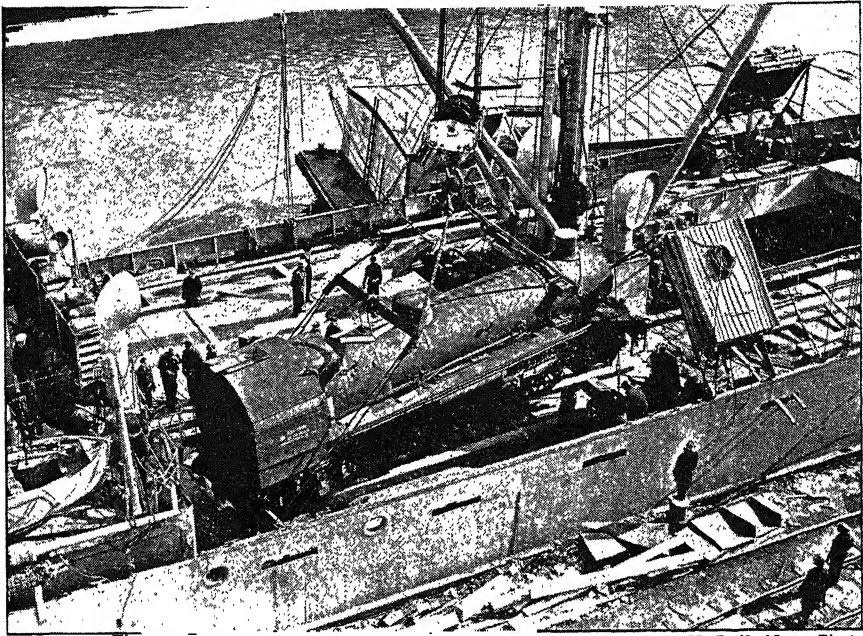
the oil west to Palestine and the Mediterranean coast. The importance of oil in modern warfare makes the protection of Iraq a prime British necessity. Britain must also keep close watch on Iraq because of its value as a corridor to the British possessions in India.

IRAN (PERSIA)

This name suggests Oriental rugs, rich embroideries, beautiful inlays, and a wide variety of artistic objects; but the country's outstanding possession is oil—one of the richest single oil deposits in the world.

Great Britain owns a controlling interest in this field, and as in the case of Iraq the protection of this great source of oil is of extreme military importance. German interests have tried unsuccessfully to get possession of Persian oil; and the Axis powers would benefit enormously from its acquisition. Russia also has a strong influence in Persian affairs.

Russia's "Burma Road." Across Iran runs the principal route for foreign matériel contributions to the Russian army. "Somewhere

*N. Y. Daily News Photo*

A locomotive for the Trans-Iranian Railroad which carries lend-lease goods to Russia is being put aboard a freighter at an American port.

in Iran" at a port on the Persian Gulf tremendous numbers of aircraft, tanks, and trucks as well as large tonnages of food, strategic metals, munitions, and guns are unloaded from ships from America and Britain to be reloaded on Russian-driven American-made trucks to start northward to a destination "somewhere in Russia." These supplies paid for by lend-lease funds are transported across more than half the globe—in fact, more than 15,000 miles, mostly by sea, they have traveled, their safety threatened by submarines and the natural hazards of the sea.

AFGHANISTAN

"It is absolutely forbidden to cross this border into Afghan Territory," the world's most famous "keep-out sign," is posted in Khyber Pass, a deep mountain gap on the boundary between India and Afghanistan. The country is about the size of Texas and has a general elevation of 2000 to 4000 feet. Peaks of the Hindu Kush range tower over 20,000 feet. Agriculture, the chief occupation, is carried on only in the fertile valleys where irrigation can be used. Fruits are grown in abundance. The country contains unexploited mineral wealth. Mohammedan laws and customs prevail.



Photo by Burton Holmes from Ewing Galloway

This sign marks the boundary between India and Afghanistan. Its location is in Khyber Pass.

SAUDI ARABIA

Arabia is a vast desert peninsula, four times the size of Texas, with an estimated population of four million. It is the heart of the Moslem world, for there are located the Holy Cities of Mecca and Medina. It is extremely hot and extremely dry; so an adequate water supply is one of its great problems. Its people are mostly nomadic tribes, their chief occupation the raising of sheep, camels, and horses. Some coffee is grown, but agriculture is possible only on the small irrigated areas. There is no manufacturing except the hand weaving of carpets and rugs.

The greatest significance of Arabia to a world at war is its vast oil reserves, now in the hands of an American company. Ibn Saud, the reigning king, has united the tribes and improved living conditions. He has close ties with the British, and the Allies have profited not only from the use of Arabian oil, but also from Arabia's strategic position along the Red Sea. It is said that the financial support of

the Arabian government comes from three main sources: (1) the oil company; (2) the British government; and (3) the profits from the swarms of Moslem pilgrims who annually visit the Holy Cities. Very few non-Moslem tourists have ever visited Arabia; and the only town where Europeans may reside is Jedda, a Red Sea port. In the postwar settlements Arabia may well be the center of some kind of unity among the Arab states of the Near East.

GUIDES TO STUDY

1. Why should we be interested in the Near East?
2. Why is the region less important than in ancient times?
3. Why have European nations for many years been interested in acquiring influence in this region?
4. Account for the importance of Istanbul.
5. What are the chief products of Turkey's farms and workshops? Which of their products come to our country?
6. What has been Turkey's attitude toward the war?
7. Iraq was for thousands of years the center of the world's wealth and culture. Why does it no longer hold that position?
8. Why may we call Iran Russia's "Burma Road"?
9. What great contributions to civilization have been made by the Near East?
10. Why are these countries of little commercial importance today?

TOPICS FOR CLASS DISCUSSION

1. Where East meets West.
2. The Jews in Palestine.
3. The British in Iraq.
4. The Khyber Pass.

WORK TO BE DONE

1. Refer to ancient histories or encyclopedias and learn something of the wealth, culture, and strength of ancient Assyria, Babylonia, Phoenicia, and Persia.
2. The Near East has made great contributions to world progress; yet its resources and general welfare today are subject to the influence of foreign powers. Explain.
3. Make a special study of Turkey and learn of the changes made in its government and customs in recent years.

2. INDIA—A LAND OF PASSIVE RESISTANCE

A land of contrasts. India is one of the most interesting countries in the world. It is a land of contrasts and contradictions. There are snow-capped mountains towering higher than any others



Photo by James Sawders

A village in northern India. Note the mud huts with thatched roofs. Many of the people of India are miserably poor.

in the world, coastal plains so hot and moist that they rival the jungles of the Amazon; deserts as hot and dry as the Sahara; and other regions receiving the heaviest rainfall in the world. Other contrasts are shown in the lives of the people. Poverty is so great that millions of people are always on the borderline of starvation. On the other hand great wealth has been amassed and hoarded by certain groups of people.

For centuries Europe received jewels, gold, silver, ointments, spices, fine textiles, and other articles of great value from India. As we all know, it was the search for a short route to this vast treasure that led Columbus to make his famous voyage that ended in his discovery of the New World.

The "wealth of the Indies" now refers to rice, wheat, rubber, tea, cotton, and jute. These goods are necessities of life purchased and consumed by the common people, not by royalty alone. This change in India's exports does not mean that India's products have greatly changed. Rather, modern means of transportation is so efficient and cheap that even the bulky necessities from India are brought within

the reach of all. The India of today possesses wealth of which Columbus never dreamed.

Britain gains India. After several nations of Western Europe including the British, Dutch, Spanish, Portuguese, and French had struggled with one another for control of the lands of the East, Britain finally succeeded in gaining India with its great resources and its great responsibilities which Kipling called the "white man's burden." The French and Portuguese still control small parts of this area. India has proved to be one of Britain's best markets, and a source of much food and raw materials. To it have gone many Englishmen to establish industries and to engage in trade. But it has also been the cause of a great deal of trouble.

India—the land. *The Himalayas*. On the northern border are the Himalayas, some summits of which have never been reached by mountain climbers. Here are the sources of India's great rivers, the Ganges, the Indus, and the Brahmaputra, which have built up the great plain to the south of the mountains and supply irrigation water for the intensive agriculture of the valleys.

The great mountains shut off cold northern winds and help in the production of rainfall by forcing winds from the sea to higher levels, thus cooling them and bringing about precipitation.

The great river plains. South of the Himalayas lie great plains including valleys of the three great rivers already named. Geologists tell us that the triangular Deccan Plateau to the south of the plain was once an immense island and was joined to the mainland by the deposition of silt washed down by the great rivers, thus forming the plain.

More than half the people of India live on these plains, gaining their living from the fertile soil watered by the rivers. When the supply of irrigation is checked, the people are faced with starvation. Through the centuries they have come to realize that their very lives depend upon the Ganges. It is regarded as India's sacred river and each year thousands of devout pilgrims journey to its banks to worship and bathe in its sacred waters.

The Deccan Plateau. This was the old island bordered on the east and on the west by mountain ridges known as the Eastern Ghats and the Western Ghats. Great lava flows in past ages overspread a large part of the plateau. The decayed lava proved to be excellent soil for cotton. Lying between the mountains and the sea both east and west are coastal plains on which rice, millet, and other crops are raised.

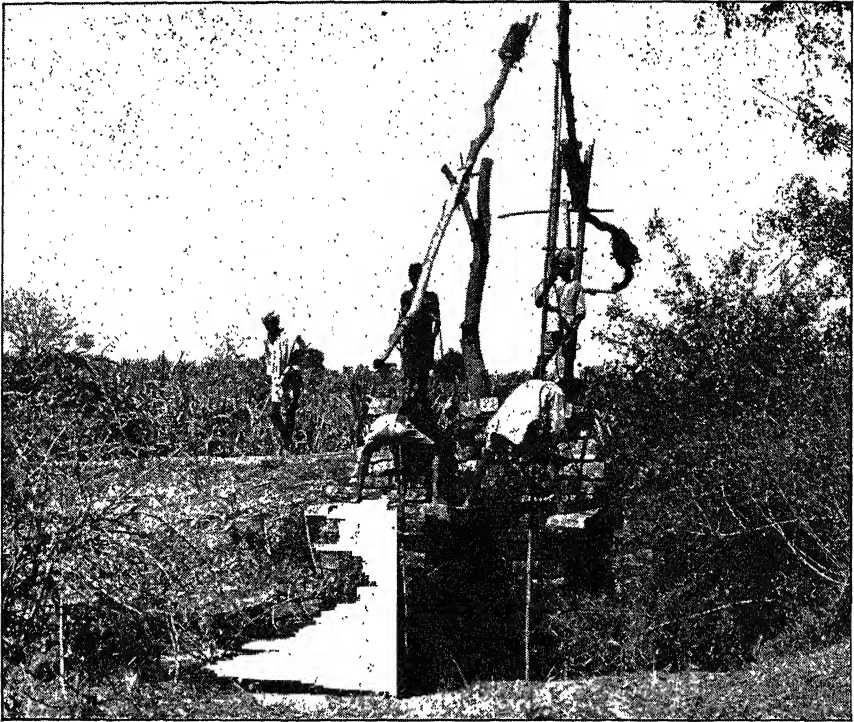


Photo by James Sawders

A primitive irrigation system in India. Water is lifted from the well with buckets and then poured into irrigation ditches in a near-by field.

The climate of India. The winds which blow over India and the rest of southeastern Asia have been called by a noted geographer "the pulse of Asia." This pulse quite unlike our own makes only one full beat a year. In the summer strong southwest and southeast winds blow from sea to land bringing rain for the summer crops. In the winter dry winds blow in opposite directions from northern lands. These winds blowing over the country one half of the year in one direction and the other half of the year in an opposite direction are known as *monsoons*. Refer again to the maps of the winter and summer monsoons on page 44.

Even in the summer parts of the country do not have sufficient rain for the crops. A great deal of irrigation is necessary in nearly all parts of India, especially on the river plains and coastal plains where rice is grown. At certain points along the Ganges all the water of the river is diverted from its bed for irrigation purposes. Water is also obtained by damming the rivers and thus retaining ponds of water for dry periods. These ponds are known as *tanks*.

Water for irrigation is also obtained from wells. In the northwest there are large desert areas.

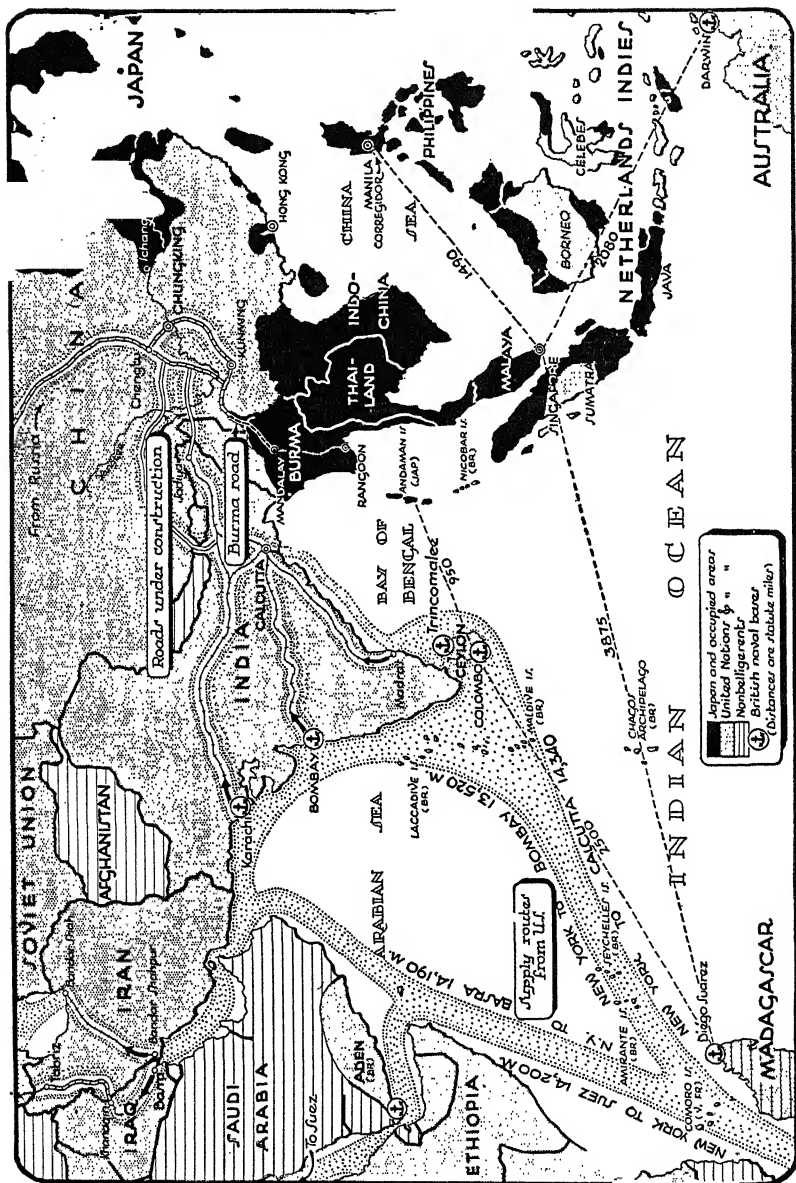
The country has a considerable range of temperatures because of its extent of latitude and because of differences in elevation. In the northwest where the rainfall is scant and the climate cool, wheat is a winter crop. In the extreme southwest nearer the equator coffee is grown. Rubber plantations cover considerable areas in southern India.

The people of India. India has been invaded by various peoples through the mountain passes of the northwest. The country was an early home of the white race and even today the greater part of its teeming millions are of that branch of the human family though their complexions are so very dark that they might easily be mistaken for colored people. There are altogether forty races speaking two hundred different languages or dialects.

The people are sharply divided by their different religious beliefs. The two largest and most influential religions are Brahmanism and Mohammedanism. Out of the former developed the caste system which with racial differences divides the people into more than 2000 different classes. A member of one caste cannot associate with the members of another and of course there can be no intermarriages. A person born in one caste cannot rise to the occupations or social standing of another caste. The 40,000,000 low-caste group are known as "untouchables." Their very shadow is a contamination to the high-caste Brahmans, or Hindus, as they are called.

Problems of government. Such racial and religious divisions have made it difficult to secure any effective unity among the 390,000,000 people of India. British control has provided orderly government most of the time; but there have been occasional outbreaks of disorder when some policy of the British authorities has proved objectionable. Transportation systems, manufacturing industries, and irrigation works have helped to improve the general economic condition of the country. But the political problem still makes the future of India a great question mark.

Political conditions in India are extremely complicated. In the first place, the country is not a unit even in political control. Scattered through India are nearly 600 semi-independent states ruled by Indian princes under treaties with Great Britain. These states range in size and population from very tiny to very large units. Altogether they occupy nearly a third of India's area. Each of these princes is interested in keeping his own power and the wealth which



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Strategic India. After Japan had cut the Burma Road to China, India became China's life line.

goes with it. Consequently they are a great obstacle in the way of any attempt to unify the government of India.

Then there are the two great population groups—the Hindus, nearly three fourths of the total population, and the Mohammedans, nearly a fifth. It is difficult to get these two large groups to agree on any policy. The Hindus themselves are split into several discordant parties, as are the Mohammedans.

India demands freedom. However, regardless of these divisions, there is a strong desire in India for independence from British rule. This desire has been made the basis of much political agitation by the noted Indian leader, Mahatma Gandhi. He has tried to secure some unity among the many elements of the Indian people and has made insistent demands for independence upon the British government. An Indian National Congress Party has been formed, including all elements of the population. It is exerting great influence upon Indian affairs. The British have promised to give India some sort of “dominion” status after the war. One of the problems of making such a plan effective will be to reconcile the conflicting interests of the Hindus, the Mohammedans, and the many Indian princes. Great Britain has profited handsomely from India as a source of raw materials and a market for British manufactures. It will be to Britain’s advantage to find a satisfactory solution to the very difficult question of Indian independence.

Indian crops. *Rice.* This grain yields enormous returns in this warm, moist climate on the level flood plains and river deltas, which are admirably suited to its growth. India and Burma formerly exported together more rice than any other country.

Wheat. This is a winter crop in the cool, dry climate of northwestern India. In recent years the only two countries raising more wheat than India were Soviet Russia and the United States. The wheat of India found markets in Great Britain and other European countries soon after the opening of the Suez Canal in 1869. Karachi is the leading port of the wheat-growing region. Rye and millet, a grain-yielding grass, are also grown over large areas.

Sugar. In recent years India has led the world in the production of cane sugar. The sugar is prepared locally and is of low grade. All the sugar produced in the country is consumed at home. Even that is not enough to supply the demand and some was formerly imported from Java.

Cotton. India is second only to the United States in cotton production. Although the acreage is usually more than three fourths

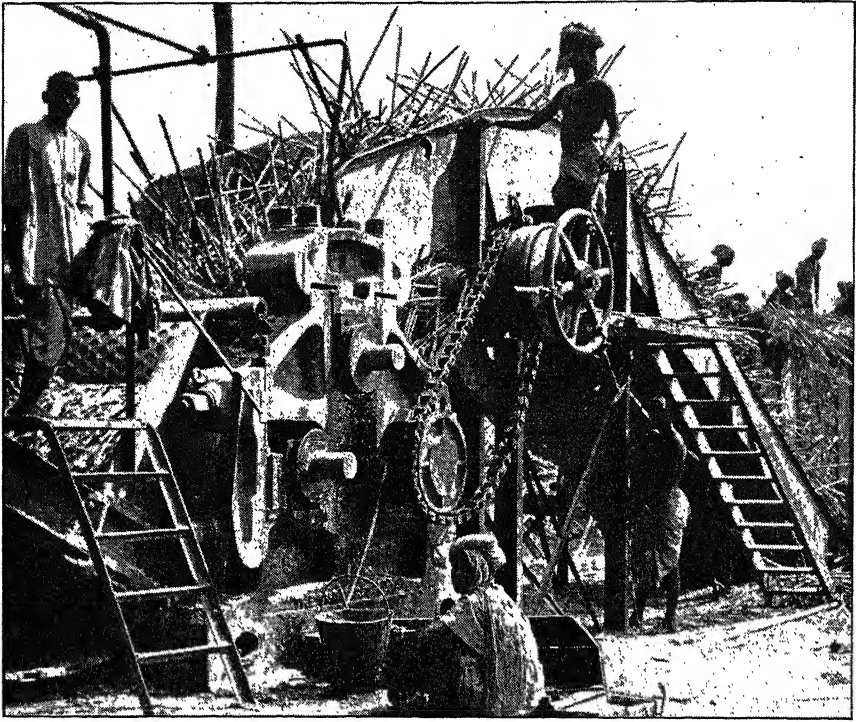


Photo from Keystone View Company

Grinding sugar cane in Lucknow, India. India leads all other countries in the production of cane sugar.

as much as ours, the yield is less than half that of the United States. In our country more scientific methods of cultivation are used, and our cotton growers use large quantities of commercial fertilizers. The Indian cotton grower is too poor even if he so desired to supply himself with modern equipment and fertilizers. Much of India's cotton formerly went to Japan, which must now find other sources of supply for this much needed fiber.

Other crops. Jute, one of our most useful fibers, is raised in large quantities on the deltas of the Ganges and Brahmaputra Rivers. This fiber and its manufactures were one of India's most valuable exports. India also led all other countries in the production and exportation of tea. India is one of the world's greatest tobacco producers, at times leading the United States in this crop. India consumes nearly all its crop at home while about a third of the United States crop is usually exported.

Because cattle are considered sacred, their meat is not eaten by the Brahmans. Peas and beans are extensively raised and take the place

of meat. Since cattle are kept chiefly as work animals, vegetable oils are largely used in the place of butter. Oilseeds used are the peanut, cottonseed, flaxseed, and mustard seed. India is the home of the jungle fowl from which our domestic poultry is descended.

Forests. Trees producing timber grow chiefly on the mountain slopes. As in other tropical lands, the forests yield mainly hardwoods. The most valuable wood is teak, which grows on the slopes of the Eastern and Western Ghats. It is customary to kill the trees by girdling and allow them to season for two years before being felled. The wood is used chiefly in shipbuilding and in making furniture. Another important forest product of both India and Ceylon is rubber. Trees which are of little commercial value but are of use locally and add to the interest of the landscape are the bamboo, coconut, mango, and the banyan tree.

Mineral resources. India's chief mineral is coal which is found in several localities and is sufficient for the country's needs. The annual production is about one twentieth that of the United States. Iron is mined in considerable quantities and pig iron has been exported. Iron and steel products, however, are one of the country's necessary imports. Manganese which is used in the manufacture of steel should be noted since India is one of the three regions leading in its production. The other two are Russia and the Gold Coast of Africa. India holds second place in this group being excelled only by Russia.

All of these minerals are of great importance, not only for peacetime industry but for the production of war equipment and munitions. This is another reason why Great Britain is anxious to keep control of this great source of raw materials.

Manufacturing in India. In recent years the introduction of modern factories has made rapid progress. Many cotton and jute mills have been established by British and American capitalists. India offers great inducements to the textile industry. Its millions of people provide a ready market for cheap cotton goods; an abundance of raw cotton is raised in the country; and the supply of cheap labor is almost unlimited. Unfortunately for Britain, as the textile output of India increases, the Indian market for English cotton goods is lost. Nevertheless Indian cotton mills help British textile manufacturers who have invested in the mills of India to compete with the cheap cotton goods of Japan.

The desire to gain control of the rich textile trade with India is one of the reasons for Japan's attempt to conquer southern Asia.

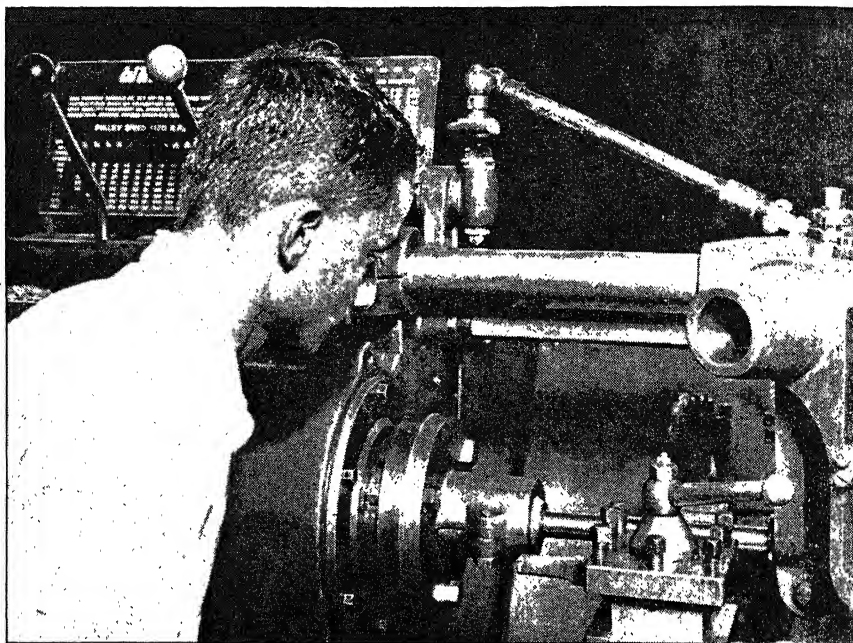


Photo from Keystone View Company

A railway workshop in India now making munitions. We have already learned how in nearly all other countries peacetime industries have turned to making implements of war.

With its cheap labor Japan could flood India with all kinds of cotton products. Japan also covets the vast mineral wealth of India.

The war effort has given a great stimulus to Indian manufacturing. Located in India is the largest single steel plant in the British Empire, and the country is said to be producing nearly eighty per cent of the items needed for its war supplies. In addition to India's production of textiles, clothing, footwear, and armament needed for the war, Indian shipyards are turning out all kinds of small war craft in great numbers.

The railways of India. India's manufactures are helped greatly by the country's railway system. India is surpassed only by the United States and Russia in its railway mileage. Besides aiding all the country's occupations, the railroads have done much to prevent famines by carrying food from regions of plenty to those of scarcity. The great seaports, Calcutta, Bombay, and Madras, have become important railway centers and in this way foreign commerce has been stimulated by the railways. The railroads have aided greatly in the movement of troops and munitions during the war now going on.

The country's foreign trade. In normal times India sold to other

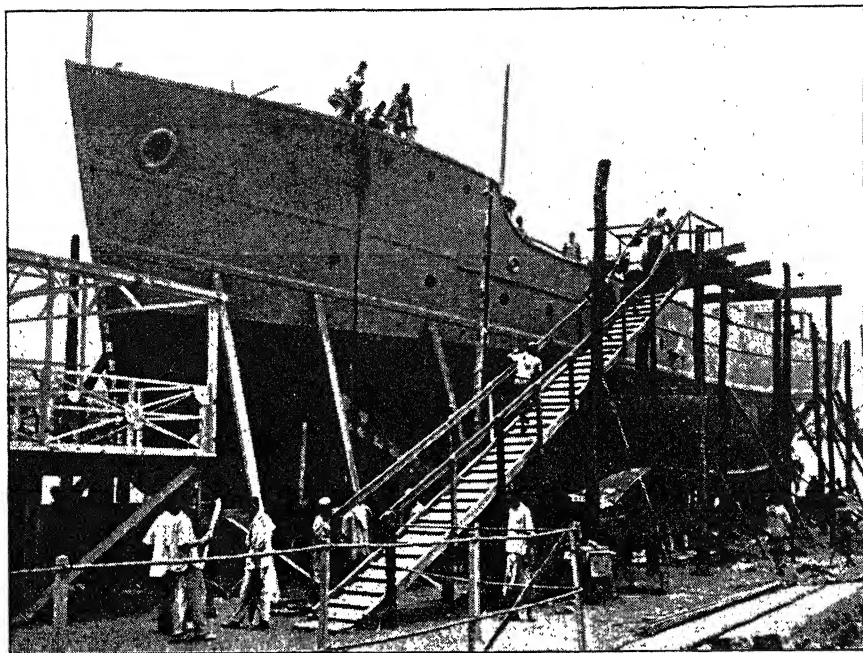


Photo from Keystone View Company

A trawler being built in a shipyard of India of steel made in that country. India has great industrial possibilities. It has many resources yet to be developed.

lands mainly foods and raw materials, such as rice, wheat, tea, jute, raw cotton, and rubber. The leading imports were cotton textiles and machinery. Shipping difficulties due to the war have greatly reduced India's foreign trade and caused shortages of many important products in Great Britain and the United States. Jute, from which burlap is made, is one of these products in which India led the world as an exporter. Now it is very scarce in England and America. Thus the lack of one product from a far-off land handicaps all our packing and baling of such items as potatoes, grains, cotton, wool, and many other things. Other Indian products which are hard for us to get on account of war conditions are tea, cotton, and rubber.

For the same reason India's imports are now largely confined to munitions and war materials, which come mostly from England and the United States. The manufacturing industries of India are being developed to supply more of the country's needs for machinery and equipment of all kinds, as well as to produce military matériel.

The seaports of India. *Calcutta* on the eastern coast of India is the chief commercial city and one of the busiest seaports in the world. Situated on the Hooghly River, one of the outlets of the Ganges, it

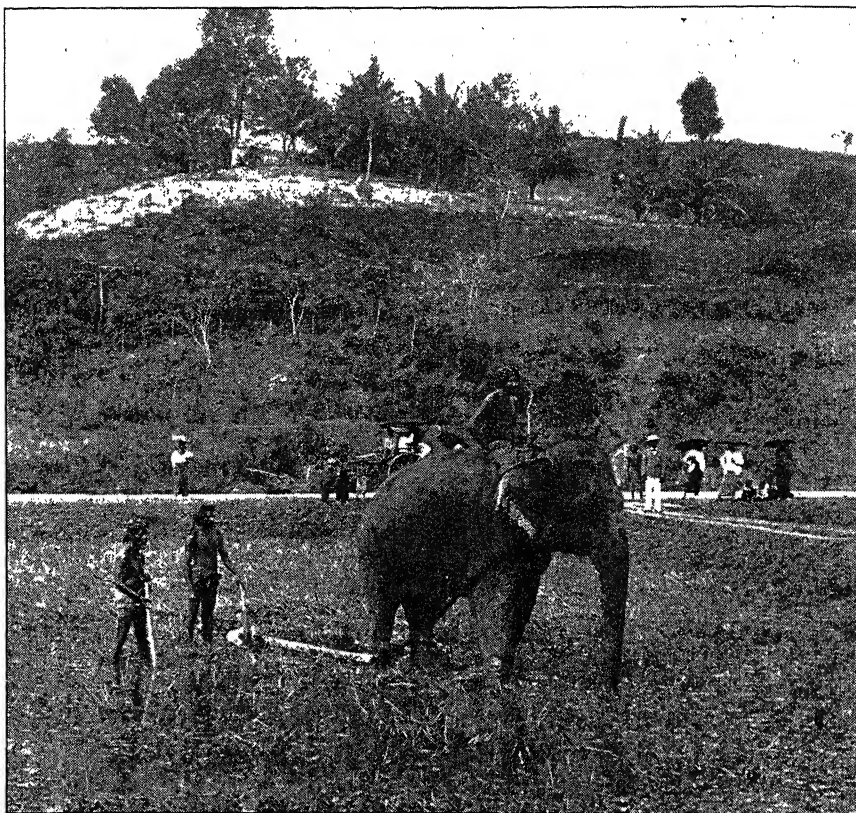


Photo by James Sawders

Plowing a Ceylon rice field with an elephant. It must take a long time to plow the field if this elephant moves as slowly as does the elephant in an American zoo.

has access to the densely peopled plains of northern India. It is also in the heart of the great jute-producing region.

Bombay, "the gateway of India," lies opposite a pass in the Western Ghats which leads to India's great cotton fields. It has a magnificent harbor with extensive docks. It is a great railroad terminal too, boasting one of the world's finest railway stations. The location of the Suez Canal has been an important factor in Bombay's growth. Like Calcutta this is a predominantly Hindu city.

Madras is the chief port of the southeast. The coast is low and the harbor is man-made. Leather, skins, and cotton goods in normal times are the chief exports. *Karachi* has already been referred to as a wheat port. It has also been a rival of Bombay in the export of cotton. *Rangoon*, the port of Burma, was noted as a rice-exporting center, but it is now in Japanese hands. Its greatest value has been as the port of entry for goods sent over the famous "Burma Road" into

China. With Burma in the possession of Japan this road is now useless, and it is very difficult for the United Nations to get much needed supplies to the Chinese armies and people.

Indeed the occupation of Burma has been a serious blow to India, since this large area is a great rice center. It also adjoins the large rubber regions of Malaya, which have been a severe loss to both England and the United States where this raw rubber is sorely needed. With Malaya the British also lost its valuable naval base of Singapore.

CEYLON

This large island off the southern coast of India is a separate colony of Great Britain. It is low and moist. There is practically one season, and that a hot summer. Many tropical products have been grown for export. Tea, plantation rubber, and coconut oil are the most important. The island is noted for its beautiful vegetation and for the great variety of animal life found there. It is also famed for its sapphires, rubies, and other precious stones. Both Ceylon and India are seats of an ancient culture which has had a marked influence on all later civilizations.

GUIDES TO STUDY

1. What may be meant by the "wealth of the Indies"?
2. In what way is India a "white man's burden" for Great Britain?
3. Of what value is India to the British?
4. Compare the influence of the Himalayas on India with that of the Alps on Italy.
5. In what ways are the people of India divided?
6. Why is the government of India a difficult problem?
7. Why is not the granting of freedom to India a simple matter?
8. What are the chief crops of India and of what value is each to the country? What crops of India are of special value to Great Britain? Why?
9. Why are the river plains the most densely settled part of India?
10. What would Japan gain by obtaining control of India?
11. Of what does India's foreign trade consist in peacetime?
12. What are the leading ports of India and what products pass through each?

TOPICS FOR CLASS DISCUSSION

1. The routes taken by luxuries from "Old India" and the routes taken by necessities from "New India."
2. Attempts to reach the summits of the Himalayas.
3. The monsoons of India.
4. The caste system.

5. India desires freedom.
6. The famines of India.
7. Ceylon and Burma as British colonies.

WORK TO BE DONE

1. Find and read selections from the stories and poems of Kipling which refer to the life and work of the people of India.
2. Draw or trace a map of India showing the location of its mountains, rivers, and cities. Indicate also the directions of the winds in summer and in winter. Why do only the summer winds bring rain?
3. India has more cattle than any other country; yet it exports no beef and uses little at home. Explain.
4. India produces more sugar than any other country; yet it usually imports sugar. Explain.
5. On a map of the world trace the route from England to India. What means has Britain for safeguarding this route? List strategic points along the route. Why is this route called Britain's life line?
6. Search newspapers and magazines to learn what is happening in India from time to time. Prepare a school bulletin board on which you can pin clippings approved by the teacher.

3. CHINA—A VICTIM OF JAPANESE TYRANNY

Old China. Chinese civilization is very old. We know that there was civilization in China before there were any established nations in Europe. In very ancient times the Chinese had learned how to grow tea, to produce silk, to make paper, gunpowder, and porcelain; had discovered the arts of printing and engraving; and had invented the mariner's compass. They had a distinctive art, literature, and music and knew something of astronomy, mathematics, and other sciences. Being shut in from the rest of the world by oceans, mountains, and deserts, the Chinese were entirely original and isolated from the changes that took place when more modern civilizations arose. Even their religion was very ancient and quite unchanging. Among the ideals of Confucius, their great teacher, was ancestor worship, and the Chinese to this day have an unfailing respect for their parents and forefathers.

The West comes to the East. It was inevitable that Western nations should become interested in the mysterious and inviting East. The explorer Marco Polo brought to Europe almost incredible stories of China and its wonders. Early Christian missionaries ventured into its unknown cities in zealous attempts to bring their religious beliefs to the teeming millions of Cathay. Some of the missionaries became



Photo by White Brothers from Monkmeier

The Great Wall of China. This wall, the building of which began 1600 years ago, extends across country for 1500 miles, and was built to keep out Chinese enemies to the north. Today China's enemies come from the east. Why would such a wall not protect a country today?

the first historical writers and map makers of the Chinese lands. Even Columbus hoped to reach China as well as the more or less obscure Indies.

About a hundred years ago European nations became interested in the Chinese markets for their growing manufactures. They were also attracted by the opportunities for profit afforded by the rich silks, furs, tea, and other products to be obtained in China. When the Chinese refused to allow foreign ships to enter their ports, Great Britain and other nations used force and several short wars followed. Finally China not only had to open most of its ports, but even had to give up complete possession of some of them and to grant special privileges to certain favored nations. Thus Hong Kong became British territory and remained so until taken by Japan. In 1894-95 Japan attacked China and took some of its territory. While the United States did not approve of this seizure of Chinese lands, nothing was done about it at the time. However, our relations with China have always been friendly; and we have helped the Chinese in many ways.

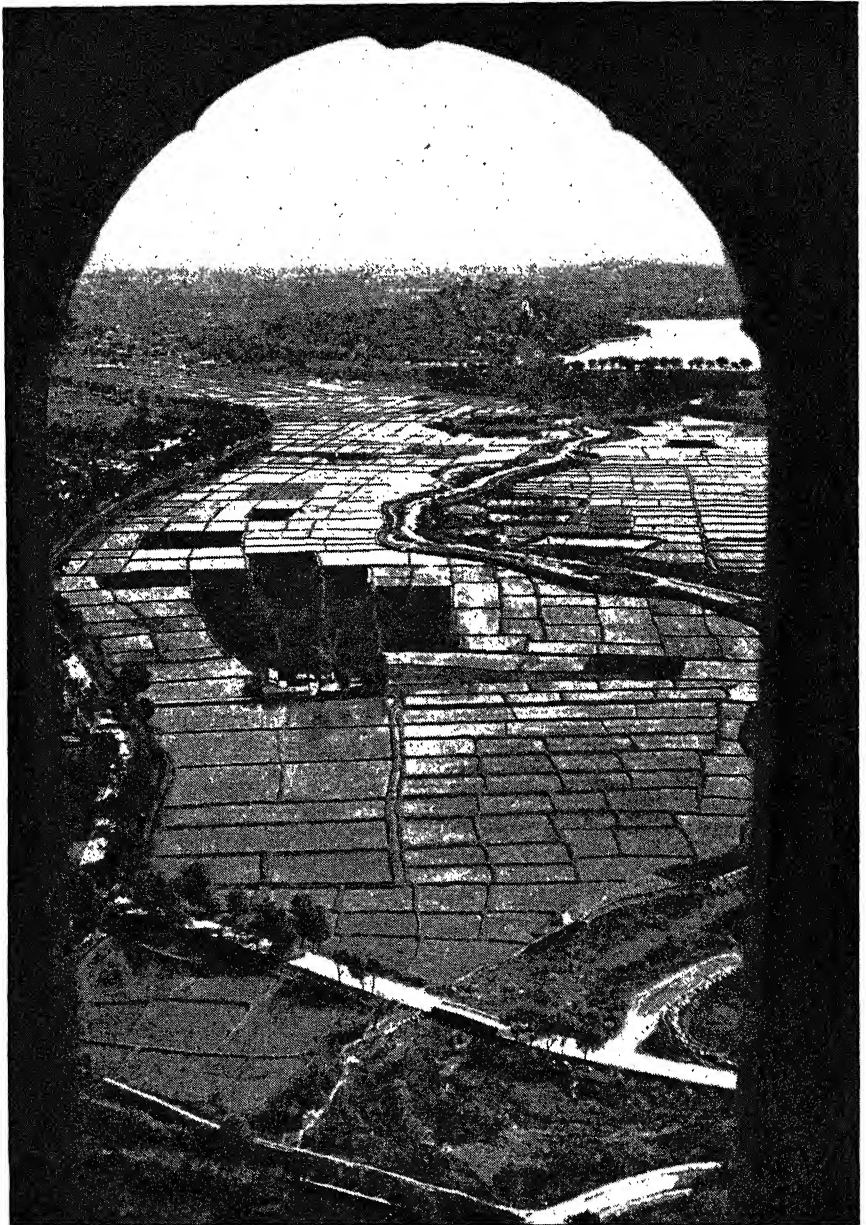


Photo by Bill Brunk from Black Star

Rice fields in China. China is so densely populated that it is necessary to use every bit of land possible for producing food.

Formosa (Taiwan) was the first large territory added to the Japanese Empire. It was taken as part of the spoils of this first war against China. The use made of Formosa by Japan will be treated

in a later chapter. In 1910 the kingdom of Korea (Chosen) was annexed to Japan and has become a valuable part of the Japanese Empire.

The East goes to the West. Chinese leaders early saw that their only hope was to learn the methods of the Western world as their neighbor Japan was doing. Chinese students were sent to the universities and industrial plants of Europe and America, where they quickly acquired the knowledge and skill needed to advance the interests of their country. Returning to China, these men became its educational, political, and commercial leaders. The result was slow but steady progress. Industries were established, railroads were built, education was modernized, and finally in 1912 a republican form of government was adopted. China was awake.

The Chinese Empire. The original Chinese Empire had an estimated area and population larger than Europe; and, when the Republic was established in 1912, China included not only China proper, the great agricultural and industrial area, but also Manchuria, Mongolia, and Tibet. China proper was almost as large as the United States. It had a population of over 420,000,000 and a population density of 145 to the square mile, compared with a density of 43 in the United States. This very fertile portion of China has a heavy rainfall, and the growing season is long enough for the production of several crops. The crowded population, however, makes it difficult to supply enough food, and slight variations in the crops frequently cause famines. Manchuria possesses valuable farm and forest lands and minerals and has a large population. Mongolia and Tibet, both lofty plateaus, are mostly desert and mountain areas of little productive value and are sparsely populated.

Trouble comes to China. In 1931 Japan again invaded China, took over Manchuria, and set up the puppet state of Manchukuo, with Henry Pu Yi, the former Manchu "boy emperor," as its new ruler. With a population almost entirely Chinese, this vast area is in reality a Japanese possession. Also a large part of Mongolia became a part of Russia's eastern domain.

Then in the summer of 1937 China's greatest calamity befell that country, a calamity which it is still struggling to escape. Japan openly attacked Chinese cities and occupied large areas of Chinese territory. Since that time the seat of Chinese government has been moved from place to place, until it is now at Chungking, far in the interior, on the upper reaches of the Yangtze River. For a long time China fought alone against the invaders. Finally, with the entrance



Resources of the Far East

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of Japan into World War II, the United Nations went to the aid of their Chinese ally. However, the plight of China today is very serious. The actual area it controls is but a fraction of its former



Photo by James Sawyers

Group of Chinese reading war news flashes posted on the bulletin board in front of a Chinese newspaper in Chinatown, New York City

territory. It has lost its most productive lands as well as its industrial cities. It has had to fall back into the mountains, where small mills, factories, and foundries have been set up in an attempt to keep its armies and its people supplied with munitions and the necessities of life. China has lost all its seaports, and the closing of the Burma Road has almost isolated it from the world outside. The only access to China today is by air or by long and difficult trails through the mountains. There is little left of China today but the will to survive as an independent people. The Chinese never admit defeat, and in the future they will undoubtedly again take their place among the free peoples of the earth.

What China was. The old Republic of China was one of the world's largest countries. It stretched from the Himalayas on the southwest to Asiatic Russia on the north, and from Turkestan on the west to the Pacific Ocean on the east. The Tien Shan and Altai Mountains roughly divided China proper into three great river

valleys: the Si, the Yangtze, and the Hwang (Yellow River). The two latter have their headwaters in Tibet. As eastern China lies in the summer monsoon belt of heavy rainfall, these rivers are periodically swollen and as a consequence have built up deltas of great fertility near the coast. The Hwang has changed its lower course about a dozen times in twice as many centuries. Because of their rich soil and heavy rainfall these flood plains constitute one of the most densely populated areas in the world.

Small farms but great crops. Since time immemorial the Chinese were a farming people, lovers of "the good earth," and seventy-five per cent of the population were tillers of the soil. On an area only one fifth of the farm area of the United States were raised the greatest crops of rice, tea, soybeans, sweet potatoes, and millet produced in any country of the world; the second largest crop of wheat; and the third largest crop of cotton. Barley, corn, tobacco, peanuts, fruits, and vegetables were also produced in large quantities. Raw silk, which depends upon mulberry trees for its production, was second only to the Japanese production. On the farms were also raised enormous flocks of poultry which produced so many eggs that China was the greatest exporter of frozen and powdered eggs in the world. Pigs were also raised in great numbers, both for food and for their bristles, which were exported. So much food was produced on China's farms that in spite of its great population, except when floods destroyed the crops, it was almost able to feed its own people. This was accomplished by intensive cultivation. Chinese farms were small, averaging four acres in size, but the farmers were expert users of natural fertilizers and skillful cultivators. Practically all labor was done by hand and no machines were used. Horses were very uncommon. The climate was so mild, the rainfall so good, and the soils so well cared for that two or more crops were usually obtained each year from each farm. Every acre of available land was used, and there was no waste. In fact, Chinese farms resembled what we would call market gardens. There was no room for the pasturage of cattle; and milk, butter, cheese, and beef were practically unknown as foods. Pork, eggs, chickens, and fish supplied the proteins and fats needed in the people's diet, and they consumed enormous quantities with their rice.

Food crops. Rice is the staple food of southern and central China where the warm, moist climate favors its growth. What wheat is to the United States, rice is to China. It takes a vast amount of hand labor to plant, cultivate, and harvest the enormous rice crop.



Photo from Black Star

A Chinese farmer plowing with a water buffalo. The Chinese are excellent farmers and are able to get large crops from their small farms.

Even with its great rice production China found it necessary to import some of this cereal.

Soybeans are a northern crop, from which a valuable oil is obtained. China in the past profited greatly from the export of this product. The oil is also used as a substitute for animal fat in cooking. The bean, which is rich in protein, is a valuable article of diet. In this way the soybean supplies a substitute for meat, which is scarce in China.

Tea was also one of China's great crops, and it is still the national beverage, but the only tea area left to the Chinese is in the west.

Raw materials. China grew more cotton than any other country except the United States and India, and much of the raw cotton was consumed in Chinese mills. Hemp, jute, ramie, and flax were other fiber crops. An interesting product of China is tung, or China wood, oil. It is extracted from the nut of a tree native to southern and central China. Its peculiar value comes from the fact that it dries very quickly and is waterproof. It is therefore used in high-grade varnishes, in printer's inks, in cable insulation, in linoleum, in automobile brake bands, and in hundreds of other ways. We formerly imported more than 90 per cent of our tung-oil requirements from China, but in the last few years the tree has been successfully grown

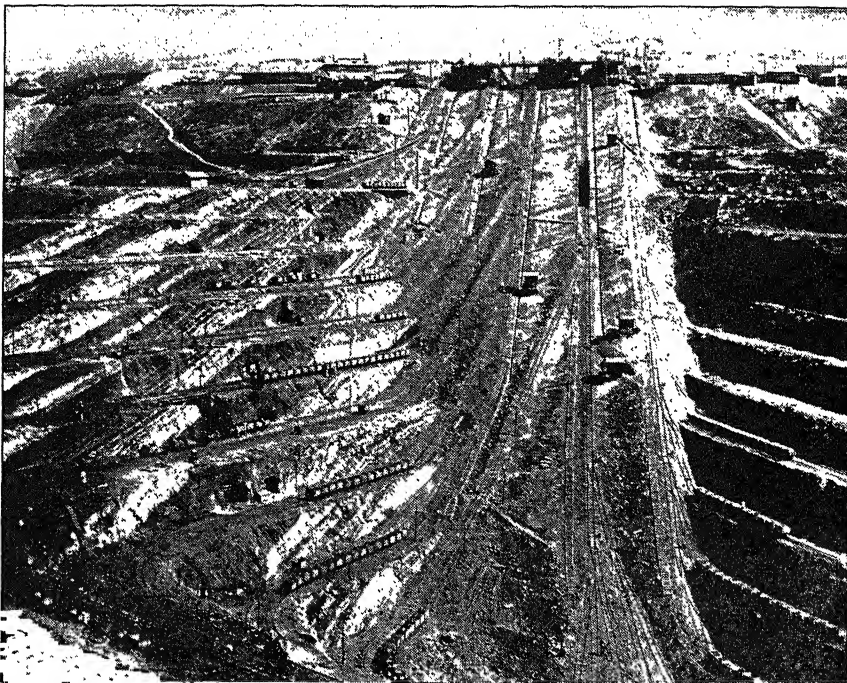


Photo from Keystone View Company

An open-cut coal mine in Fushun near Mukden, Manchukuo. This mine reminds us of our own open-cut coal mines in the Pennsylvania region. It also helps us to understand why Japan is so deeply interested in the affairs of Manchukuo.

in several of our Southern States, and we are supplying more and more of this product for our own uses. With our higher labor costs this oil is more expensive than that coming from China; but like many other things tung oil has many uses in our war industries, and its production is being pushed here as rapidly as possible.

Silk in China. The production of raw silk is an important industry in China, where it has been produced for thousands of years. Legend says that a Chinese princess was the first to unwind a cocoon and spin its silken thread. China formerly sent a great deal of raw silk to the United States although Japan was our leading source of supply.

Minerals awaiting use. China is rich in many kinds of minerals, some of which have been used for many centuries while others have been hardly touched. Among the minerals of considerable importance are antimony, tin, tungsten, manganese, mercury, lead, zinc, and many others. Both gold and silver are mined, but the minerals of greatest value to the future of China are its iron and coal. China is considered by experts to have both coal and iron deposits which

are among the most extensive on the globe. In fact the iron industry of Shansi is said to be the oldest in the world. However, as with its other resources, China has lost much of its mineral wealth to Japan.

The fate of Chinese industry. For many centuries Chinese industry was entirely hand labor and largely on a small-scale, household basis. But the Chinese had made rapid progress in the establishment of textile mills, flour mills, ironworks, tanneries, paper mills, and cement works until all their efforts were rendered futile by the Japanese conquest of the great industrial centers.

The raw materials for many industries are found in great profusion within China. When China regains its lost territory and secures the financial backing to rebuild its ruined factories, mills, and foundries, it will again develop its industries to a high state of production. Such a result will not only benefit China itself by making the country more nearly self-supporting, but it will also increase Chinese purchasing power in the world's markets. The Japanese invaders have been ruthless in their destruction of such Chinese industrial plants as they did not need for their own use. They have even torn down large numbers of buildings in order to salvage scrap iron and steel to use in their war industries at home. Even before the war Japanese owners had acquired control of many Chinese industries.

Transportation on land and water. China has excellent ports for foreign trade, but its inland transportation is still inadequate although much progress has been made in this respect. Good highways outside of the cities are still scarce, and an enormous quantity of freight is carried in great wheelbarrows or on the backs of coolie porters. While human labor is very cheap in China, this means of transportation is very slow and therefore expensive in the end. The best means of travel and transportation are the rivers and canals which cover much of China in a great network. At present both roads and waterways are under constant attack by the Japanese, and most of them are completely under enemy control.

The Yangtze, the Hwang, and the Si Rivers are the most important. The Yangtze is navigable by ocean-going steamers for nearly 800 miles. Beyond that for a distance of about 1000 miles it is alive with river steamboats and junks. Near the great cities these Chinese rivers are covered with houseboats in which many thousands of poor people make their permanent homes.

Railroads are the greatest transportation need of China. For a long time the Chinese feared and fought against the introduction of railroads. They feared that the railroads would deprive human por-



Photo by Mrs. Branson De Cou from James Sawders

A gasoline filling station in Nanking, China. The architecture of the station suggests a Chinese temple.

ters of their livelihood and that they would in some way disturb the ancient dead. Thus the sedan chair, the cart, and the wheelbarrow are still in use over wide areas although some progress has been made. There are now over 6000 miles of railroad in China. Compare this small total with the 20,000 miles of railroad in the small area of Great Britain and the 239,000 miles in the United States. But here again constant warfare has caused great destruction.

When peace comes again to China, there will probably be a great growth in air-transport systems which will supplement and feed the rail and river lines all over the country. The Chinese had already made considerable progress in this respect before the Japanese invasion.

Chinese trade. The dense population of China involves an enormous domestic trade, in which many of the country's products are absorbed in internal commerce over the roads, rivers, and canals which carry a vast traffic to and from the interior.

The principal imports of prewar China were raw cotton, tobacco, metals, chemicals, petroleum products, machinery, and other manufactured articles. Exports included eggs, tin and other minerals, vegetable oils, silk, tea, bristles, and miscellaneous hides and skins. Imports came mostly from the United States, Japan, Germany, and Great Britain in that order; exports went to the same countries, in about the same order. It is interesting to note that China's greatest total trade was with our own country.

The future of China. The China of today is fighting for its life as a nation. It has complete trust in its political leaders and in Chiang Kai-Shek, its president and commander in chief. Its first problem is to rid itself of the Japanese menace and to win back the twenty-four provinces of China proper now occupied by invading armies, for these provinces are the richest, most productive, and most populous part of China's former area. Without the farms, mines, industries, and seaports of this lost domain China cannot hope to survive as a great nation. Even Manchukuo with its forests, farm lands, and minerals is of far less importance than this great core of old China.

When China regains these twenty-four provinces, it will again become a great producer of grains, soybeans, tea, cotton, silk, and other valuable foods and raw materials. With its mines and industries restored, its railroads renewed and extended, and its sea and river ports reopened, China will again become a great factor in world trade. All of these results depend primarily upon the freeing of China from the grip of Japan.

When China is again free, it will still have great political and economic problems to meet. At present the war has produced a feeling of unity among the Chinese. But in the past the country has been infested with independent leaders, called "War Lords," and with many bandit chieftains. There has also been a strong communistic element in some parts of the country. It will require wise and strong political leadership to prevent these disturbing factors from hampering the future progress of the new China. It will be to the advantage of the other United Nations to assist China to reorganize and stabilize its future government.

The new China will also face serious economic difficulties. These will involve chiefly the repair of the enormous damage inflicted upon the country by the ravages of a long and cruel war. Railroads and their equipment must be restored, roads must be rebuilt, mines reopened, and industries reestablished. Ruined farms must be brought back into production, and new farm areas developed. Only in these



Photo by Mrs. Branson De Cou

Peiping (Peking), China. The coolie who draws the jinrickisha or rickshaw is enjoying his noonday meal of rice and tea. The coolies live a hard life and get little in return.

ways can China increase its yield of food and raw materials, upon which the support of its people and the development of its trade depend.

China will need help. In order to bring about this economic rebirth of China large investments of foreign capital will be necessary. After years of devastating war China will lack the finances to develop its own great resources. Even in the past China's imports have always exceeded its exports, giving the country an unfavorable trade balance. There is no reason why Chinese exports cannot be greatly increased, thus improving its financial position. In this way China will become even a greater market for American and European manufactured products, since its purchasing power will be increased. With a larger foreign trade China's economic condition will be much improved and its vast population will gradually become more pros-

perous. With peace and some measure of prosperity restored, China should progress toward a better life than it has had in the last decade of war and desolation.

Many Chinese products are in great demand in Europe and the United States and its future restoration to political and economic strength will benefit the rest of the world as much as China itself. The ousting of Japan from China will also free China from the domination of Japanese financial control, under which most of the Chinese railroads and many of its key industries have been operated at great profit to Japan.

Chinese cities. *Shanghai* is to China what New York is to the United States. Although it is twelve miles from the coast on one of the mouths of the Yangtze, it has a deep sea harbor. It has the most advantageous position in China for domestic and foreign trade. It has a large international settlement. *Peiping* (Peking) and *Tientsin*, its port, are the chief cities of northern China. For 500 years, until 1928, Peking was the capital of China. It has important railroad connections with the Trans-Siberian Railroad. *Canton*, the chief city of southern China, has been in existence for 2000 years or more. It has been the center of the silk trade. It also exported tea, and many of the firecrackers, made from our old newspapers, came from there. Canton has a large river population. *Hankow*, an important river port on the Yangtze, is located at the head of ocean-going transportation; there is also an extensive river traffic for several hundred miles beyond. It is a great commercial city, the center of large iron and steel and cotton industries. *Nanking*, the ancient capital of China, is a center for the manufacture of munitions. With the exception of Hankow, these cities each have a population of 1,000,000 or more.

Hong Kong. An island off the coast southeast of Canton is Hong Kong, formerly a British Crown colony, but now in Japanese hands. It has one of the best harbors in the world and was the outlet for a large part of the exports of China, especially those of southern China.

GUIDES TO STUDY

1. What are the meaning of the statements: (1) The West comes to the East? (2) The East comes to the West?
2. How has ancestor worship affected the development of China?
3. What were the parts of the old Chinese Empire? What are the resources of each?
4. What parts of Chinese territory have been seized by foreign nations? Why have they done this?
5. Why has Japan been particularly interested in China?

6. Name and locate the great rivers of China. How do they influence the life of the country?
7. How is it possible for the Chinese to raise very heavy crops on their small farms?
8. How does Chinese agriculture differ from ours?
9. What raw materials are raised on Chinese farms? How were they marketed?
10. How have Chinese industries changed from hand labor to the use of machines?
11. China has coal and iron. Why is it not then a great manufacturing country?
12. Why did foreign capitalists establish cotton mills in China?
13. What are the means of transportation in China? What effect have these had on the development of the country?
14. Why does a great country like China have so much difficulty in protecting itself against foreign invasion?
15. What are the possibilities for industrial and commercial development in China?
16. What are Chinese patriots trying to do for their country? What are some of the problems they have to solve?

TOPICS FOR CLASS DISCUSSION

1. Confucius and his influence.
2. China's ancient civilization.
3. The Japanese in China.
4. The food of the Chinese people.
5. Life on houseboats.
6. Chinese in the United States.
7. Our interest in China.

WORK TO BE DONE

1. On an outline map of Asia trace the boundaries and print the names of all the provinces of China. Locate regions which formerly belonged to China. Print the names of the bordering waters, rivers, and largest cities.
2. Make a list of contributions which ancient China made to civilization.
3. Topics for special reports: (1) The Boxer Rebellion; (2) The loss of Manchuria; (3) The Japanese invasion of China; (4) The value of Tibet, Mongolia, or Sinkiang; (5) Methods of Chinese agriculture.
4. Make a special study of the Burma Road and its importance to China.
5. What is the United States doing to help China defend itself?
6. Keep in touch with what is going on in China by use of current publications and the radio.
7. On a large sheet of paper trace an outline map showing the provinces and rivers of China. Print names of provinces, rivers, and bordering bodies of water. Pin the map on the wall and from time to time locate on it places mentioned in the news. Locate also when possible the resources and products of the country.

4. JAPAN—A WOULD-BE WORLD CONQUEROR

JAPAN AND WAR IN THE PACIFIC

The Far East and the Indies. Japan, third member of the former Berlin-Rome-Tokyo Axis, is the have-not nation of the Far East. It has proved not one whit less aggressive than Germany or Italy. Indeed it was Japan that in recent years showed the other have-not members of the Axis how "might makes right." Japan came to know its strength when it defeated China (1894-95) and later Russia (1904-05) and seized Weiheiwei from Germany during the World War. As a result of the war with Russia Japan gained nearly all of Russia's rights in Manchuria. Japan gradually increased its authority in this part of China and finally established the government of Manchukuo in such a way that it seemed to be free but was in reality closely controlled by Japan. This took place in 1932. Since then by means of threats and by actual invasion with airplanes and armies the Japanese have carried on an undeclared war in China and have brought under their influence, if not under their complete control, large areas to the south of Manchukuo. In these areas by means of puppet governments similar to that of Manchukuo and by means of companies formed by Japanese officials, the Japanese are trying to restore order out of the chaos which they themselves created by ruthless warfare. It is their purpose, they say, to create a "Co-Prosperity Sphere for Eastern Asia" as the other dictators attempted to do in their "New Order in Europe."

The Japanese claim that they have as much right to carry out their plans in the Far East as the United States has to enforce the Monroe Doctrine in this part of the world. Of course it is the purpose of the Japanese to develop the resources and industries of China, eastern Asia, and the island groups of the Pacific in such a way as will enable them to serve best the purposes of Japan.

In spite of warnings from the Allied Powers, and probably at the insistence of Hitler, Japan struck the first blow at the Hawaiian base of Pearl Harbor on December 7, 1941. Simultaneous attacks were made on the Philippines, Hong Kong, British Malaya, and the Dutch colonies. The American possessions, Guam, Midway, and Wake Islands, were also attacked. Japan treacherously started hostilities at the very time that Japanese ambassadors at Washington were seemingly seeking to find a formula that would avert war in the Far East. On December 8 the Congress voted a declaration of war on Japan.

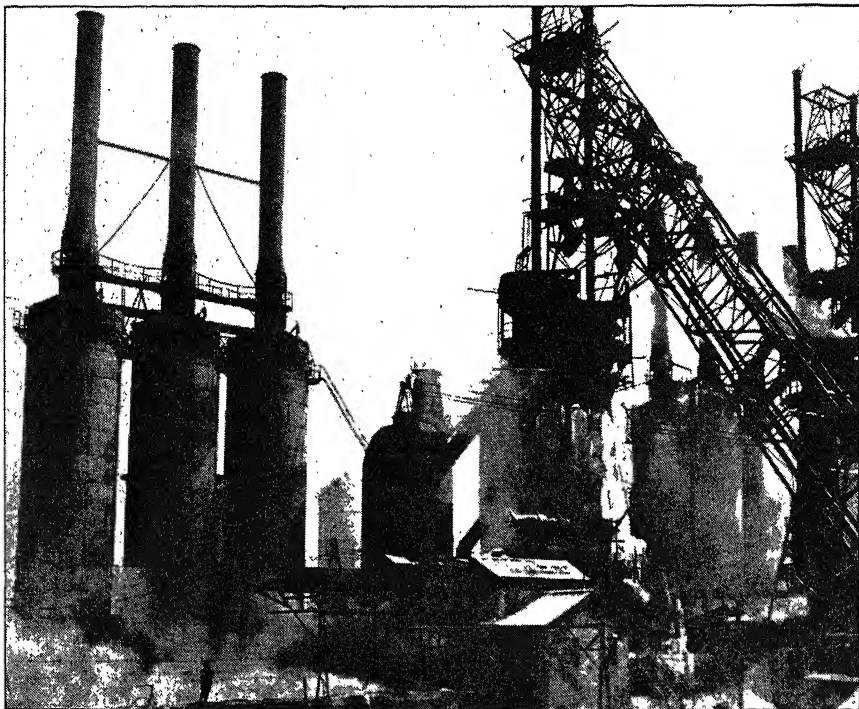


Photo from Keystone View Company

A steel plant in Manchukuo. The Japanese are developing the resources of this country for their own uses.

The British declaration followed immediately. Three days later Germany and Italy declared war on the United States. The global war was on.

Not a new nation. Japan, like China, is a country with a very old civilization although China was probably the more highly developed of the two regions in ancient times. It is certain that the early Japanese lacked the originality of the Chinese, who invented and discovered so many different things.

But, like China, Japan refused for a long time to have anything to do with foreigners and was a self-centered nation. In 1853 Commodore Matthew C. Perry of the United States Navy went to Japan, and in the following year a treaty was made which allowed foreign ships to enter five Japanese ports. The Japanese at that time were very backward. They still used bows and arrows for fighting; their government was an ancient form of feudalism; iron and steel and mechanical power were practically unknown; and living standards were very low.

Japan goes Western. Japan began very early to copy the indus-

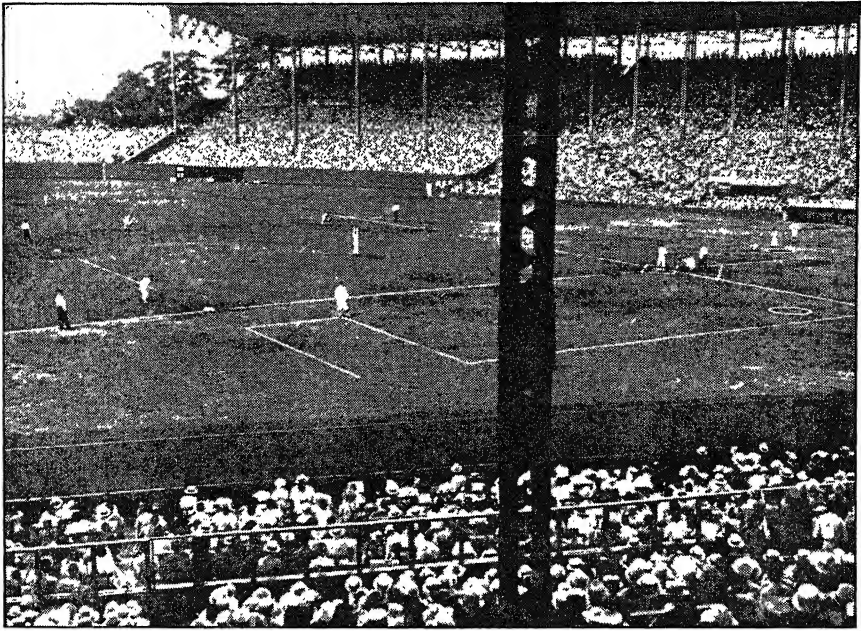


Photo from Ewing Galloway

Japan has gone Western in a big way by its adoption of baseball, the great American sport. This ball park is in Tokyo.

trial, commercial, educational, military, and naval ways of Europe and of the United States. The Japanese people are skillful, intelligent, industrious, and intensely patriotic. Japanese students went to all parts of the world and brought back home the most modern ideas in every branch of human activity. These ideas were adapted to Japanese conditions with the result that Japan made such rapid progress that it was rated as one of the seven great powers of the world even before its present adventure in global war.

How Japan resembles Britain. Japan resembles Great Britain in many ways. Both are island empires. Japan proper includes four large islands and a large number of small ones. But Honshu, the largest and most populous island, has almost exactly the same area as the island we call Great Britain (England, Scotland, and Wales). Moreover, the density of population in Japan is about 469 to the square mile, while in Great Britain it is about 498. Thus we see that both are crowded countries. As we might expect under such circumstances, there is much industry in both countries.

How the two differ. But there are great differences between Japan and Great Britain. The first concerns food. England has never in modern times been able to feed its own people; but Japan



Photo by James Sawders

Men and women in a Japanese rice field are transplanting young plants. What would we think of planting each of our wheat plants by hand?

has always supplied most of its own food and imported a few luxury items. To understand this difference between Japan and Great Britain we have only to examine the food habits of the two peoples. The British in normal times eat large amounts of wheat bread, meat, milk, butter, and other dairy products, much of which they must import. The Japanese live largely on rice and fish, with tea as their ordinary beverage. They raise abundant crops of rice, take vast quantities of fish from the surrounding waters, and produce their own tea. Their diet of fish and rice is said to be well balanced since the fish supplies protein and the rice carbohydrates.

The second difference between the two countries has to do with industry. Japan has not enough coal for its growing industries and has to import a considerable quantity. The total coal production of Japan is only one sixth that of Great Britain. Japan also has some iron ore, but not nearly enough, and must import most of its requirements. Great Britain also imports iron ore, as its own supply is not sufficient. But in iron-ore production Great Britain ranks fourth among the countries of the world, being exceeded only by the United States, France, and Russia in that order. Japan is far down on the

list. The result of these conditions is that Japan was annually seventh or eighth among the world's nations in the quantity of its iron and steel production while Great Britain has been fourth in the same list.

Japan looks to the mainland. This lack of coal and iron ore was one of Japan's real reasons for embarking on its career of Asiatic conquest. This purpose was evident even in the conquest of Korea (Chosen) in 1910. This area is very rich in minerals. Gold is the most valuable mineral in actual monetary value, the Korean gold output in 1936 being worth about \$30,000,000. But far more important for Japan were the coal and iron ore of Korea, which in the same year were valued at upward of \$15,000,000. We have seen that Manchukuo gave Japan both food and raw materials. But the Japanese also wanted the mines and industries of China proper. For a long time Japanese capital had been invested in Chinese mines, factories, railroads, banks, and business houses; and China was well covered by Japanese commercial and political agents. It is interesting also to note that Japan annually imported vast quantities of scrap iron and steel from the United States to help supply its need for these metals.

The Japanese in Korea (Chosen). Korea's minerals have been used in the manufacture of chemicals, explosives, war materials, and all kinds of metal products. More than seventy-five per cent of its 22,000,000 people are engaged in agriculture and still live in great poverty. There is a strong underground movement for freedom from Japan. While less than five per cent of the population work in industry, the Japanese owners gain enormous profits from these activities on account of the very low wages paid. The people are in virtual slavery.

The Japanese use Korea in several ways. First, they are expanding the growth of cotton instead of food in order to supply the textile mills of Japan. Second, they are getting all the coal and iron possible out of Korea, also to supply Japanese heavy industries. Third, they are developing in Korea itself lighter industries, such as textiles, chemicals, and light machinery, all for domestic markets and for export to China and Manchukuo. The general Japanese policy seems to be to get from its colonial possessions the raw materials to keep the heavy industries of the homeland supplied for war materials, shipbuilding, railroad equipment, and textiles. Then they hope to develop close to the raw materials the industries necessary to supply the local markets and to produce a surplus for export. In this



Photo from Keystone View Company

Weighing bags of soybeans in Manchukuo. The Chinese say that the name of this state is still Manchuria. Why?

way Japan hopes to become one of the greatest industrial powers of the world.

Korea also has great strategic importance because of its nearness to Japan itself. It would supply an ideal base for an air offensive against Japan.

Differences in colonial possessions. A third difference between Great Britain and Japan is in the areas of their colonial possessions. We need merely to mention the world-wide spread of the British Empire with dominions in three continents and possessions in six. This colonial empire of course supplies food, raw materials, markets, and a population outlet for Great Britain.

Until quite recently Japan had only Korea (Chosen), Formosa (Taiwan), Karafuto (part of the island of Sakhalin), and some small but strategically important islands given to it at the end of the first World War. Then Japan seized Manchukuo, with its abundant natural resources.

The British have sent millions of settlers into their overseas lands; but the Japanese have never colonized their conquered territories. Some say that this is because Manchukuo and Korea were already well populated and that the former was too cold to attract Japanese

settlers. But even the tropical island of Formosa has but a comparative handful of Japanese residents, and these are mostly officials and overseers of one kind or another. There were far more Japanese in Southern California, Mexico, and South America than in all the Japanese colonial possessions combined.

There are probably several reasons for these facts. First is the Japanese dislike to leave their homeland, which they love very much. Second is the desire of the Japanese government to keep a dense population in Japan itself, in order to have the manpower for both industrial production and the armed forces. Third is the Japanese purpose to use native races in conquered areas to supply productive labor under Japanese direction. The Japanese are strong in the capacity of overseers of cheap forced labor. If they could keep even a fraction of such vast regions as Java, Borneo, Sumatra, Malaya, Thailand, Burma, Indo-China, and China itself, they would have a rich colonial empire, but they will be forced to give them all up.

Similarity in industries. The most marked similarity between Japan and Great Britain is in their textile industries. Both are great cotton manufacturers. The British mills have four times as many spindles as the Japanese; but Japan consumes more raw cotton than Great Britain and about half as much as the United States. The explanation of this peculiar fact is that the British mills make a great many fine fabrics requiring only a small amount of raw cotton, while Japanese mills manufacture large quantities of coarse and cheap goods which take much more raw material to produce. The British product is of course far more valuable than the Japanese; but the latter is well suited to the Asiatic markets, where cotton is the universal material for clothing and poverty is so general that only the cheapest goods can be sold. The low cost of labor in Japan has enabled the Japanese to sell their goods in all parts of the United States and Europe as well as in China and India. This condition helps us to understand why Japan uses more raw cotton than Great Britain. It also explains why Japan wants complete possession of southeastern Asia. With these lands in its power Japan would not only have abundant sources of raw cotton, but unrestricted control of the native markets for the articles made from cotton and the other fibers and minerals so plentiful there. This Japanese need for raw materials is illustrated by their efforts to increase the yield of both cotton and wool in Chosen. According to latest reports there are more than 600,000 acres of land in Chosen devoted to growing cotton, with an annual yield of nearly 100 million pounds of ginned cotton. The

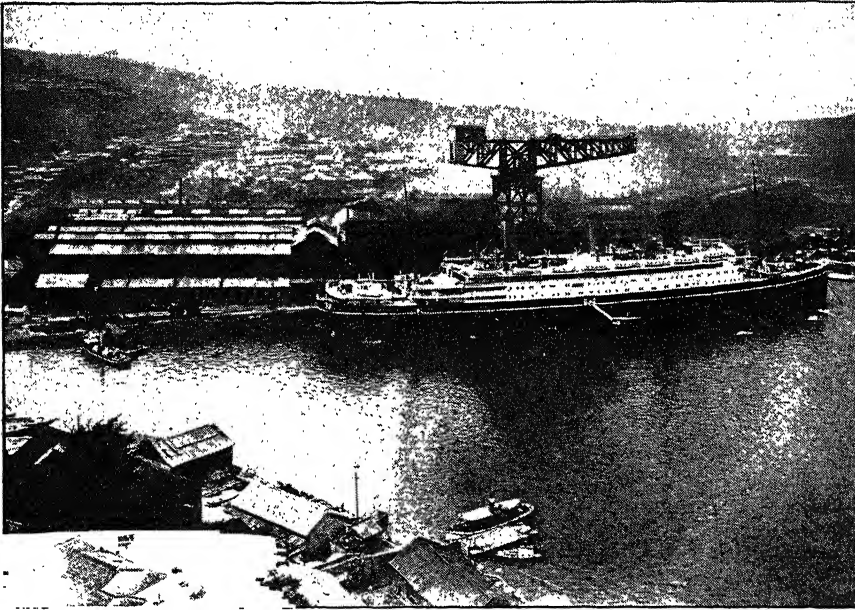


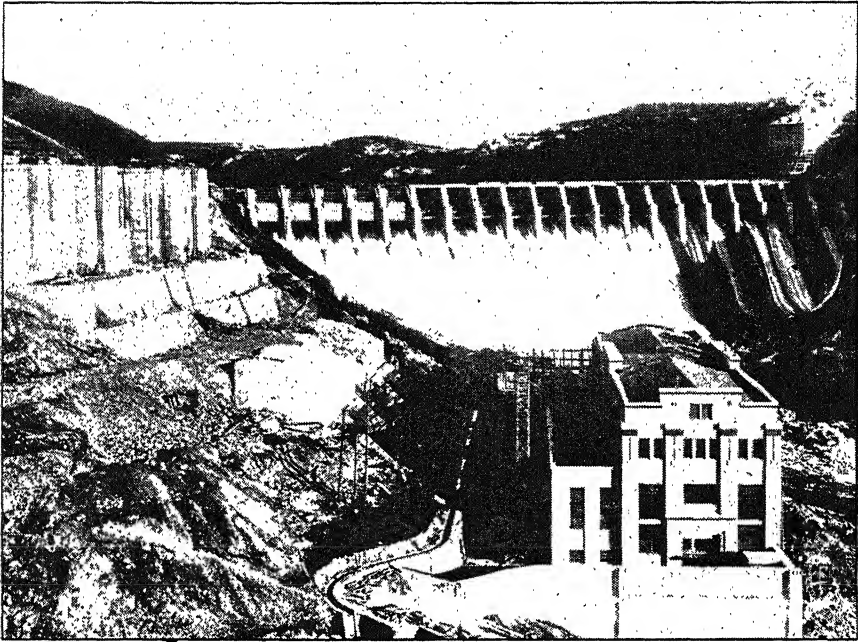
Photo by Gruber from Monkmeyer

A shipyard in Nagasaki, Japan. For years Japan has been building ships at a rapid rate. Before the war its ships were seen in all great ports.

sheep-raising project has not been so successful, but it has made some progress.

Comparison of shipping resources. Japan and Great Britain both have large merchant marines. The British merchant fleet totals four times the tonnage of the Japanese; but Great Britain has been the world's leading shipowner for centuries while Japan is comparatively a newcomer in this field. The progress of Japan in this respect is shown by the fact that during the ten years from 1927 to 1937 the Japanese fleets were increased by over half a million tons, while in the same period the British fleets decreased by more than one and a half million tons. As a result Japan in 1940 ranked third among the countries of the world in its merchant marine tonnage, being exceeded only by Great Britain and the United States. All three countries have made enormous increases in the number of their merchant ships since that time.

Raw materials and power for manufacturing. Great Britain produces a large amount of raw wool, but its production is much less than it requires. It must import wool, getting it from Australia, South Africa, and South America. On the other hand Japan produces nearly eighty per cent of the world's raw silk. These are both textile raw materials. But Great Britain uses all its wool in its own



Japan's rivers from mountain-fed streams furnish abundant power to be transformed into electricity.

mills and imports an enormous quantity besides; while Japan has sent most of its raw silk to other countries for manufacture.

Japan has one advantage to offset its lack of coal. Its many mountain streams produce abundant water power which is used to operate hydroelectric plants, supplying power for many mines, mills, and factories. Japan now obtains over four million horsepower from its rivers, which is about equal to the water power of France and is exceeded only by that of three countries—Italy, Canada, and the United States.

Agriculture in Japan. Japanese agriculture, like that of China, is intensive; and rice is the chief crop of both countries. While only one sixth of Japan's area is agricultural land, more than half of its people are farm workers, cultivating small plots of land which average only one or two acres in extent. As in China, hand labor is the rule, fertilizers are skillfully used, crop rotation is practiced, and two or more crops a year are common. The monsoon region is featured by abundant summer rainfall and a long growing season. In the extreme south subtropical conditions favor hot-weather crops while farther north and in the highlands the more temperate climate gives good yields of various grains. Under modern conditions each



Photo by James Sawders

Japanese farmers threshing rice with flails. The woman at the left is separating grain from the straw.

region specializes in the crops which it is best able to produce, and improved transportation facilities make it possible to send these products to all parts of the country. There is little room for pasturage of domestic animals except in Hokkaido. There are less than 100,000 sheep in all Japan, compared with more than 25,000,000 in Great Britain.

Rice to eat. About half the cultivated land in Japan is used for rice. Everything favors this crop. The abundant rains make it possible to keep the lowlands covered with water, which is essential in the growing of rice. The monsoon rains never fail; so there is never a crop failure due to lack of moisture. The temperature is always mild, thus removing all danger from either frosts or excessive heat. The soil seems to be exactly right for rice.

With all these favorable conditions and the improved methods encouraged by the government, Japan's rice production averages over 2500 pounds per acre, which is a larger yield than that of any other country. Japan is not the largest rice producer in the world since India annually raises nearly four times as much as Japan proper.

and nearly three times as much as Japan, Chosen, and Taiwan together. But in order to secure this greater crop India uses eleven times the acreage used in Japan proper and more than six times the combined areas of the three Japanese producing regions. With all its production Japan still imports some rice, as this grain is the staple food of the Japanese people. They even use it to make a very potent wine called *saké*.

To make Japan self-sufficient in this cereal is another reason for the Japanese desire to take over the rice-raising regions of the lands it has seized. For the same purpose it has pushed the development of rice growing in Formosa (Taiwan). Another food product needed by Japan is sugar. Again in Formosa they have expanded the sugar industry greatly, both for local use and for export both to Japan and to other countries.

Silk and tea to sell. The two cash crops of Japan have been silk and tea, and of these silk supplied the greater profit. A climate suitable for the growth of mulberry trees, on which the silkworm feeds, an abundance of cheap labor, and centuries of experience in the industry make Japan the world's greatest silk producer. The fibers of silk are produced by the worms as they weave their cocoons. Inside these cocoons the worms change into moths. If left to themselves these moths break through the cocoons and in doing so break and tangle the silk fibers. In order to prevent this the cocoons are heated to kill the moths. The cocoon is then softened in warm water, and the fibers are easily unwound and reeled into skeins. All of this requires a great deal of hand labor, which makes silk an expensive fiber to produce. The Japanese production is so great that it not only supplies the needs of the Japanese silk mills but leaves a large surplus for export. In recent years the value of this raw-silk trade has amounted to over \$100,000,000 annually, adding greatly to the national income. The war has of course shut off this trade.

Tea is also a cash crop of Japan although not nearly so profitable as silk since a very large proportion of the tea is used by the Japanese themselves. A favorable climate and cheap labor make tea raising profitable. Much of the labor on the tea plantations is done by women and girls. In fact women and children do a vast amount of work on Japanese farms and in the mills and factories. Wheat and other grains and many fruits and vegetables are also raised.

Food from the sea. The warm and deep waters surrounding Japan supply a great variety of fish, of which the Japanese consume a vast quantity. Statistics show the per capita consumption of fish in



Photo from Ewing Galloway

Japanese women tea pickers cutting leaves from the bushes with shears similar to the ones we use to trim hedges

Japan to be three times that in the United States. Before the present war canned crab meat, salmon, and other fish were prominent in the list of Japanese exports. The canned crab meat had a large sale in the United States.

Japanese industry. Besides its great textile industry Japan has made enormous strides in iron and steel manufactures, particularly in shipbuilding. Nagasaki is a great shipbuilding center. Much of the iron and steel needed in this industry was formerly imported from the United States and Europe. For the manufacture of electrical machinery and apparatus Japan has a great asset in its copper production, in which it ranks sixth among the nations of the world. Among other prominent industries are the manufacture of paper, pottery, matting, and various small artistic products. Japanese novelties have been sold all over the world. Despite the lack of many raw materials Japanese industry is very profitable because of the low labor cost. Large numbers of people from the farm regions go into the cities to work in the mills, giving a constant supply of cheap



Photo by R. Moulin from Ewing Galloway

Japan has more than 15,000 miles of railway. Much of the equipment used is made in Japanese shops after American models.

labor. One result of this condition is a very low standard of living, with poor housing and a quite limited food supply. In spite of this, however, the Japanese government has tried to improve educational and social conditions, particularly in the crowded cities. Just as in China, there is a great deal of home industry in Japan. The Japanese are naturally skillful handworkers and are quick to learn all kinds of mechanical processes. Like all other countries at war Japan has geared its entire industrial machine to the production of the matériel and equipment of war. Planes, tanks, naval vessels, munitions, and all necessities of a great warring power are made in Japan, and the effort is a vast one for a country the size of Japan. Like other countries in the war, Japan has increasing difficulty in finding the necessary manpower for both industry and war. The railroad mileage of Japan is more than twice as great as that of China. Japan is well supplied with newspapers, and the publishing business is constantly growing.

Japanese trade. Compared with other great powers, the foreign trade of Japan has always been small. The imports in recent years

amounted to less than \$800,000,000 and the exports slightly less. With the large population, the per capita total trade amounted to a little over \$25. Exports were always slightly below imports, giving an unfavorable balance.

Japan's great gamble. What Japan probably desires more than anything else is control of the trade of the Far East. This would make Japan an extremely wealthy world power. In prewar days Japan had to import raw materials and a great many manufactured goods. It was the world's greatest exporter of rayon and raw silk, and sent cotton goods to China, India, and to the islands of the British and Netherlands Indies. The United States took nearly 90 per cent of Japanese silk but our exports to Japan annually amounted to 50 per cent more than the value of the goods which Japan sold to us. Japan constantly had an unfavorable trade balance, which was partially overcome by the profits from foreign investments and from shipping. The Japanese also capitalized on their scenery and travel facilities; the tourist trade, which was encouraged by generous advertising, brought large annual profits to the country.

Japan's great gamble in the present war is to free itself from dependence upon other nations for raw materials, to develop industries in captive territories, and to monopolize the foreign trade of these lands as well as their domestic markets. At the same time Japan hopes to get into a position of such economic strength that the whole world will have to pay tribute to its vastly increased production. To win this great gamble Japan must not only hold the lands it has seized, but must also develop them and keep their native populations under control. It must also secure financial profits to pay for its enormous war machine and to restore and operate the industries which it is now fighting to retain.

If the Allies succeed in wrecking the manufacturing and ship-building centers in Japan proper, it is hard to see how Japan can win this great gamble; for the control and exploitation of any colonial empire depends primarily upon the strength and stability of the mother country.

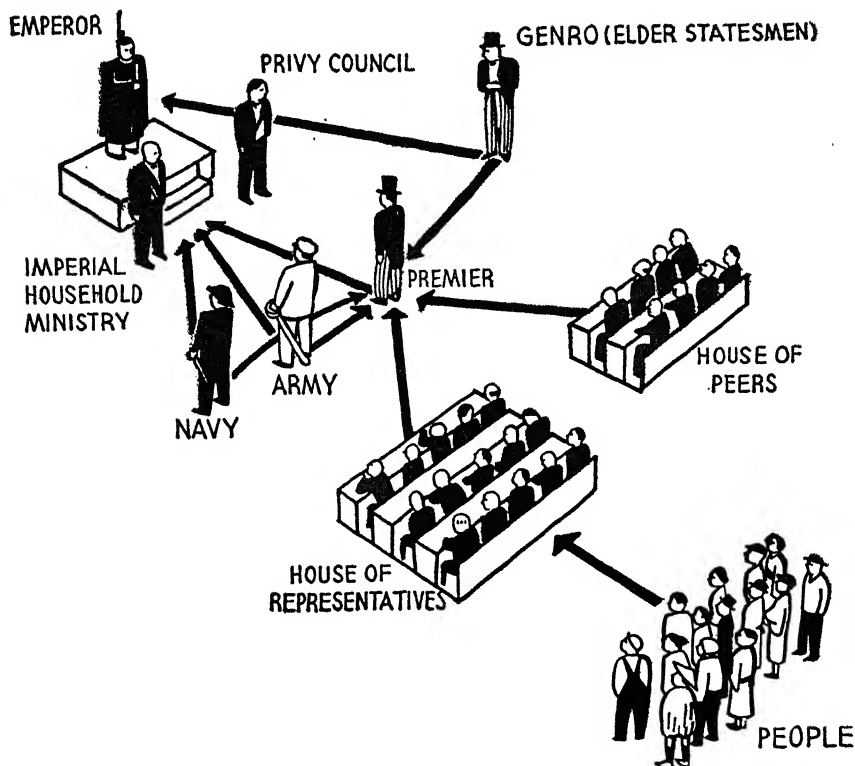
Japan's war aims. One of Japan's motives in seeking to conquer all of southern Asia and the East Indies is undoubtedly this desire to become a great industrial and commercial power. In the past all of these regions have had to import their manufactured goods from Europe, the United States, and in small amounts from Japan itself. Now the Japanese hope to build up an industrial empire outside of Japan, utilizing the raw materials of the conquered lands wherever

they are found. In addition to the minerals and cotton already referred to, the Japanese have gained a vast store of other products. Perhaps the three most important are rubber, oil, and tin. All abound in Malaya, Burma, Thailand, Indo-China, and the East Indies. Even in peacetime Japan could not possibly consume all these products for its own use. But if it can develop its own oil refineries, rubber processing plants, and tin mines in various parts of its new empire, Japan will soon dominate world trade in rubber and tin, and have a monopoly in the oil trade of the East. The low labor costs in the Asiatic oil fields, rubber plantations, and mines have been a strong factor in the great profits obtained from these areas by the British, Dutch, and American companies operating these concessions. The Japanese have simply seized these properties from their former owners and intend to exploit them for their own profit. They claim that they have freed the native peoples from European domination; but they have only placed these races under a system of practical slavery. The conquered peoples themselves have already made it clear that they are far worse off today than under their former status. On the whole the British and Dutch treated the Asiatic natives with consideration and fairness and improved their living conditions very much. When Japan is forced to restore the properties it has stolen by conquest, it is hoped that even better political and economic arrangements will be put into effect for the millions of native peoples who inhabit these lands.

Cities of Japan. *Tokyo*, the capital and chief city of Japan, is really the heart of the Japanese Empire. The governmental departments, foreign embassies, legations, and trading companies have their headquarters there. It is one of the largest cities in the world, having an estimated population of 7,094,600. As a center of learning it ranks high, the Imperial University being one of the best in the world. *Yokohama*, the seaport for Tokyo and the chief port for the entire country, has an open harbor on the Pacific Ocean. It is an important naval base as well as a commercial port. Its population is more than 700,000. *Osaka* with a population of 3,394,000 is the second largest city in Japan. It is an important airport where all the empire's air routes converge. It is a large rice and tea market. *Kobe*, an important seaport, with a population of over 1,000,000, is the center of Japan's great shipbuilding industry. Much of the trade with China passes through this port. The exports are cotton goods, rice, copper, porcelain, and camphor. *Kyoto*, the former capital and the most beautiful city in Japan, is a manufacturing city which specializes in

JAPAN'S RULING SYSTEM

THE GOVERNMENT UNDER ITO'S CONSTITUTION

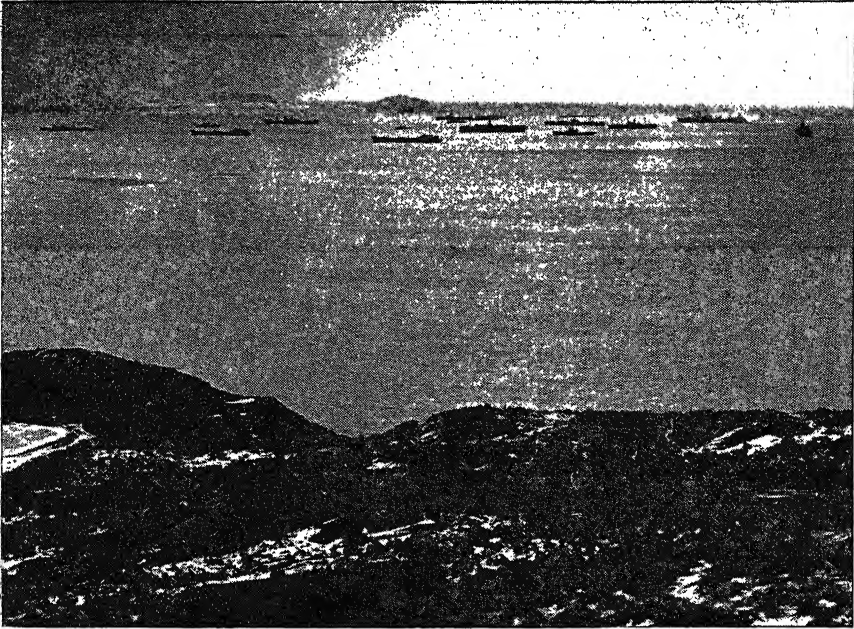


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fine silks, brocades, velvets, rich lacquer ware, and handsome inlaid articles. It has over 1,177,000 inhabitants.

The Japanese government. The government of Japan is a peculiar mixture of emperor worship and dictatorship. The emperor is considered divine by the worshipful Japanese; yet he is not the real ruler of Japan. There is a legislative assembly with the forms of democracy, but the real rulers are the military clique which has convinced the people that war and conquest are their divine destiny. As is usually the case a few families of great wealth profit enormously from the manufacture and supply of the munitions of war. Japan may be said to operate under the dictatorship of its high-ranking military and naval officers.

Japan's rim of steel. The steel we refer to here is not the steel of commerce, but the steel in forts, planes, naval bases, and military



Official U. S. Navy Photograph

Ships bring what it takes to make a base. Men and materials of war in plenty are needed. These are American ships in Kuluk Bay, a good harbor, on the eastern side of Adak Island in the Aleutians. This island is 244 miles from Kiska and 435 miles east of Attu.

armament which Japan has placed on the rim of islands facing eastward across the Pacific toward Hawaii and the United States. At the close of the first World War Japan was given control over numerous small island groups which seemed unimportant at the time. But with future conquest in view, Japan proceeded to occupy and fortify many of these island outposts. By treaty Japan was forbidden to fortify the islands; but the treaty was ignored. Among these islands are the Mariannas, Marshall, and Caroline groups, as well as several smaller islands. Since the start of the present war Japan has of course seized other Pacific outposts, giving it now a very strong barrier against attack from the east and also giving it bases from which to attack our supply lines from Hawaii to Australia. Even in the Aleutians the Japanese gained a foothold at Kiska and Attu, from both of which they have been completely dislodged. At the northern end of Japan is the long chain of the Kuriles, with an advanced base at Paramushiro, not far from Russian Kamchatka on the Asiatic mainland. Wake and Guam were taken from us early in the war. Guam has since been retaken by our forces. Our Pacific outposts face these Japanese strongholds from Samoa to Alaska; but the Japanese

are in a strong position to protect their newly conquered Asiatic empire.

GUIDES TO STUDY

1. How do the Japanese people differ from the Chinese?
2. What were the evidences of Japan's increasing strength in the Far East?
3. How has Japan increased its hold on China?
4. What do the Japanese hope to gain by creating a Co-Prosperity Sphere in Eastern Asia?
5. How did war between the United States and Japan begin? What victories were won in rapid succession?
6. How were the Japanese awakened from a very backward condition?
7. How does Japan resemble Great Britain: (1) in location? (2) in resources? (3) in industries and trade?
8. How is it possible for a densely settled country like Japan to supply nearly all its own food?
9. How does Japan differ from Great Britain in its opportunities for commerce?
10. Why has Japan cast longing eyes on the mainland of Asia?
11. What has Japan gained from its control of Chosen (Korea)?
12. How does Japan differ from Britain in colonial possessions?
13. In what respects is industrial Japan similar to industrial Britain?
14. How do the merchant marines of the two countries compare?
15. How do they differ in their supplies of raw materials and in their power resources?
16. Why is the Japanese diet so largely limited to rice and fish?
17. What conditions in Japan favor the production of silk? Why has the price of silk fallen rapidly in recent years? What is taking its place?
18. What has made possible Japan's great advances in manufacturing? How does this advancement explain the country's wartime strength?
19. It has been said that Japan's motto might well be—"Adopt, adapt, adept." Explain what that means as applied to Japan.
20. Why does Japan wish to control the resources and trade of the Orient?
21. What is Japan's "rim of steel"?

TOPICS FOR CLASS DISCUSSION

1. Japan before 1853.
2. Japan and the Axis.
3. The Co-Prosperity Sphere for whom?
4. Japan's dependence upon the sea.
5. Japanese in the United States.
6. Japanese cities and their occupations and products.

WORK TO BE DONE

1. On the same outline map of Asia used for China print names of all islands belonging to Japan. Indicate the parts of the mainland controlled wholly or in part by Japan. Print names of surrounding waters. Shade in a distinctive way the regions captured by Japan since Pearl Harbor.

2. Study carefully the pictures relating to Japan in this section and write a summary of what they tell.

3. Have the class select a few topics which they would like to have presented to the class in greater detail. Then appoint one or more to study and report each topic.

4. Draw a large map of Japan and the regions which it now controls either on a blackboard or on a large sheet of paper. Fill in this map from time to time as events happen in any part of the area mapped.

5. THE SOUTHWEST PACIFIC—SPOILS OF WAR

An empire of islands. Stretching from the Philippines on the north to Australia on the south and from Sumatra on the west to the Solomons on the east lies Japan's coveted empire of islands which received but scant attention until they were engulfed in the flood of global war. A few figures will give some idea of the extent of this empire.

New Guinea, Borneo, Sumatra, the Philippines, Celebes, Java, the Timor Archipelago, and other islands have an area of over one million square miles, with a population of roughly 75,000,000. This vast region was divided among Great Britain, the Netherlands, and the United States, which had a protective interest in the Philippines whose independence had been promised in the near future.

Geographically we should include with this island empire the mainland regions of Indo-China, Burma, Malaya, and Thailand; for these are similar to the great islands in climate and resources. These lands cover an area of 800,000 square miles, with a population of over 55,000,000. They will be considered at the end of this chapter.

A storehouse of natural treasures. On these islands is found an amazing wealth of natural resources. One of the most valuable for the uses of modern life is petroleum, found on several of the East Indian islands. The petroleum of this region amounts to only about three per cent of the world total; but its location near the great ports of China and Japan makes it a very valuable asset. Even in normal times a great deal of oil was imported into this area in addition to the local supply. The loss of this oil is a calamity for the Allies, and its possession a vital factor in Japanese operations.

Rubber is the most valuable cultivated product of this region. More than sixty years ago a British horticulturalist grew some rubber trees in a London greenhouse from Brazilian seeds. The little trees were taken to Ceylon, and they thrived in the hot moist climate there.



From this beginning came the great rubber plantations scattered through southeast Asia. So productive have the plantations become that they supply more than ninety per cent of the world's raw rubber, with only five per cent coming from the wild rubber trees of Brazil and other countries. Scientific cultivation and improved processing of the crude rubber, together with cheap native labor, have combined to give this region a virtual monopoly in this product so vital to motor transportation and other needs of modern life. More than half of the annual yield of these plantations was exported to the United States until the Japanese conquests shut off our supply. The rest went largely to the United Kingdom and other European countries. The loss of these rubber imports handicaps all industrial countries. Our present synthetic rubber program is progressing so favorably that we may in the future find it unnecessary to go back to the use of natural rubber.



Photo from Keystone View Company

Plantation rubber in a warehouse in Ceylon. The first rubber trees grown in the Indies were planted in Ceylon.

Tin is the most valuable mineral product of this area. The tin mined in the Netherlands Indies alone amounts to about twenty per cent of the world total. Some of it is smelted near the mines, but most of the ore was formerly shipped abroad for smelting. Tin is a scarce metal, very important for many industrial uses. This metal is vitally necessary in all the complicated mechanism of modern engines of war. The loss of our Asiatic supply of tin leaves the United States with Bolivia as our main source of this metal. In world production of tin Malaya ranked first, Netherlands Indies second, and Bolivia only third. This is another case where the Japanese hope to enjoy a monopoly in a vital raw material. Other minerals found here are bauxite, iron, manganese, gold, and silver.

Some other products in which this region leads the world are quinine, pepper, kapok, coconut oils, and expensive woods, such as teak and mahogany. Sugar is also grown in great quantities. Tea, coffee, and miscellaneous spices are also raised.

The industries of the islands are chiefly connected with the refining and processing of its natural products, such as oil, rubber, minerals, foods, fibers, tobacco, and native woods. There are no

heavy industries, and all machinery must be imported. However, in recent years some foreign corporations have established branch factories to avoid paying import duties on articles of light industry. Such products as automobile parts, tires, batteries, soaps, radios, cutlery, and other small items are thus produced in the islands. In all the islands there is an abundant supply of water power for the production of hydroelectric current.

In the Philippines the growth of hemp for cordage is very important, and other fibers are used in hat making. Together with hemp, sugar, coconuts, and tobacco supply the livelihood for seventy-five per cent of the Filipinos. Strangely enough, one of the leading industries is the embroidering of cotton and silk fabrics, for export either as piece goods or as made-up garments. Gold is by far the most valuable mineral; but iron, manganese, tungsten, chrome, and copper are also important, especially for war uses. Manufacturing industries, besides embroidery, dressmaking, and hat making, include food processing, textiles, cigar making, cordage, and woodworking.

NETHERLANDS INDIES

Recently druggists all over the United States have been requested to turn over to the Federal Government any supplies of quinine they might have on hand. This drug, so helpful in the treatment of malaria, is especially needed by men in our armed forces who are now fighting in the fever-ridden islands of the East Indies and the South Pacific. The scarcity of this drug is just another reminder of our dependence on the Netherlands Indies.

Before they were taken by the Japanese in 1942 these islands supplied the world with nine tenths of its quinine, one third of its rubber, and nearly one fourth of its tin, besides large quantities of petroleum, spices, sugar, coffee, tobacco, and vegetable oils. Not until these supplies were cut off did we realize how much we depended upon these islands for the necessities of life.

The area of the Netherlands Indies is three times that of Texas and the population is more than one half as great as that of the United States. The extent of the islands from east to west is as far as from New York to San Francisco, and from north to south the distance is much the same as that from New York to Savannah. The area is also fifty-five times that of Holland, the mother country, and the population is seven and one half times that of the homeland.



Photo from Keystone View Company

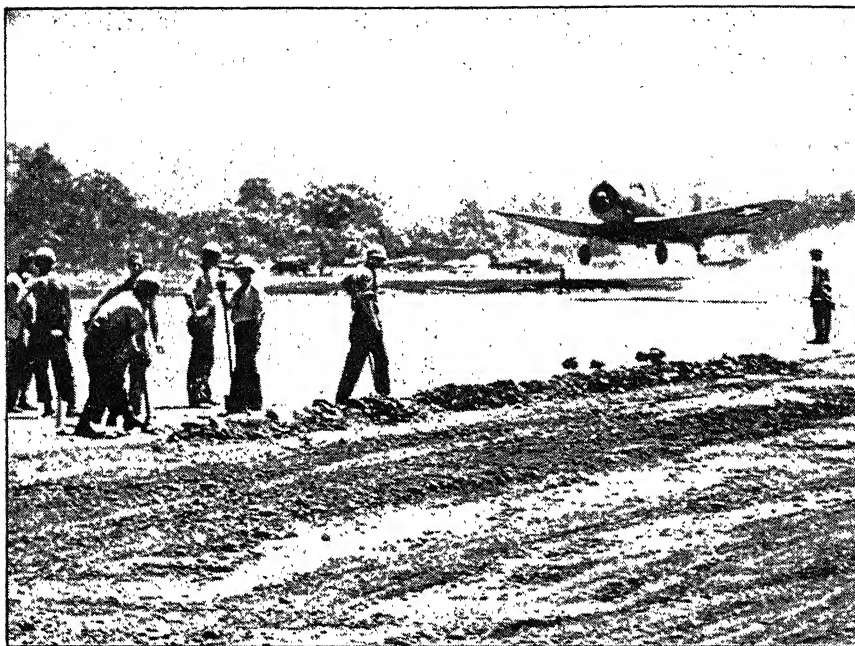
Young cinchona trees in Java. From the bark of these trees quinine is obtained. Since the capture of the Netherlands Indies by the Japanese, cinchona trees have been planted in Central and South America. The central Andean countries were the original home of cinchona.

When the Japanese seized the Netherlands Indies they added (temporarily, we believe) a whole empire to their dominions.

The Dutch did much to bring prosperity to the islands. They established law and order and thus reduced the number of wars among the different tribes. They practiced scientific methods of irrigation and introduced seeds and plants from other lands including coffee, tobacco, quinine, sisal, and the oil palm.

As the population increased, it became necessary to limit the areas devoted to the new crops, so that there might be left land enough for rice, the chief article of food for the people. If these islands are not soon released from Japanese control, the people formerly depending upon these products must look to other areas for similar necessities or find substitutes which will answer the purpose or do without these products until the Japanese are ousted.

Java contains by far a greater number of people than any of the other islands. Java has extensive plains easily cultivated. The mountain slopes are gentle and can be farmed. Rain is abundant and during the dry season water from mountain streams is at hand for irriga-

*Acme Photo*

Clearing land for airplane runways on Guadalcanal. An airplane is taking off to harass the Japanese.

tion. Here, too, in Java is carried on the greater part of the manufacturing introduced by the Dutch.

Whenever we are asked to drive less and more slowly in order to save our tires, or when we are asked to collect tin cans that we may have tin for our manufacturing plants and to send to Washington our supplies of quinine, we are compelled to realize how near to us was faraway Netherlands Indies.

We should give especial attention to New Guinea, one of the islands of the East Indies. This is the third largest island in the world. Before World War I it was controlled by three different nations. The northwestern section was a part of the Netherlands Indies; the southern section—the territory of Papua—was British and the northeastern section was German. At the close of World War I the German section, known as the territory of New Guinea, was mandated to Australia. This territory includes the Bismarck Archipelago, the chief islands of which are New Britain and New Ireland. The capital of this territory is Rabaul on the island of New Britain. Early in the present war the whole island was seized by the Japanese, but General MacArthur's men have driven the Japanese from most of their strongholds.

If you read the newspapers during the year 1943, the names of certain places in New Guinea have become very familiar. Some of these are: Port Moresby, the Owen Stanley Mountains, Bona, Buna, and others. We have also learned of the tangled jungles, the torrential rains, the intense heat, and the reedy swamps. When our men return from this region, it, too, will never seem so far away as before.

New Guinea is one of the best places in the world to teach us the great value of the airplane. Much of the fighting on the island and over the surrounding sea has been carried on by planes. Long before the war prospectors using planes discovered gold far in the heart of New Guinea. Mining machinery and men were taken in by plane and gold was taken out by plane.

FURTHER ASIATIC CONQUESTS

The mainland. Burma, Thailand, Malaya, and Indo-China resemble the island empire in many ways. Their climate and products are practically the same.

Burma's great staple is rice, in which it leads the world. Its most valuable mineral product is oil; but it is also rich in iron, lead, tin, silver, tungsten, zinc, and copper.

Thailand (Siam) also has rice as its great food product; it also is a large producer of rubber and tin. Teak wood is an important special product.

Malaya's greatest assets are rubber and tin. Before the war this region supplied half the world's rubber and one third of its tin. Its other minerals are the same as those of Thailand.

Indo-China is another great rice granary, ranking next to China and India in this respect. It also grows rubber, cotton, silk, and other fibers. It has a vast reserve of high-grade anthracite, comparatively untouched. Cement is another product. As in all of these countries industry is less important than agriculture. This then is the great southwest Pacific area which is at present in the grasp of Japan. Never in history has there been so vast and valuable a prize as the spoils of war.

GUIDES TO STUDY

1. What are the larger islands of the Southwest Pacific? What mainland areas are closely associated with them?
2. What are the chief resources of the Southwest Pacific and by whom were these resources developed?
3. How did this region come to be a producer of rubber and what part of the world's supply did it furnish?

4. To what extent did the world look to this region for its supply of tin?
5. What are the chief resources of the Netherlands Indies?
6. What is the importance of quinine? How does it happen that the Netherlands Indies have contributed nearly the whole of the world output?
7. How have the Dutch improved living conditions in the islands?
8. What are the leading products of the mainland of Southeastern Asia?
9. What are the forest and mineral resources of this area?

TOPICS FOR CLASS DISCUSSION

1. The climate of the Southwest Pacific.
2. Life of a service man in this region.
3. What parts of the world are benefited most by the resources of the Southwest Pacific.
4. The Dutch in the Indies.
5. Quinine—in America and in the Far East.
6. The airplane in New Guinea.

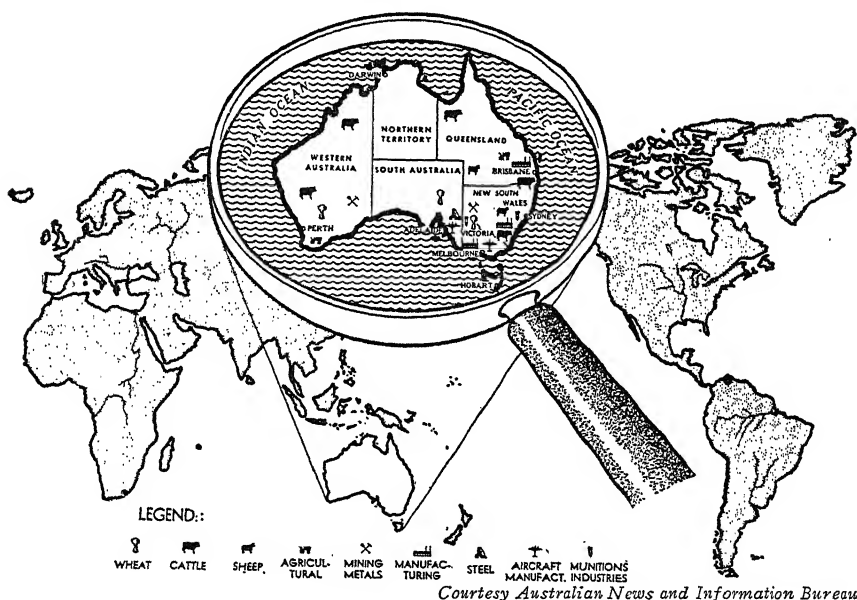
WORK TO BE DONE

1. On an outline map locate as many of the islands of the Southwest Pacific as you can. Print names of important places and those which have played an important part in the war.
2. Review the story of rubber as it applies to this part of the world.
3. Review the uses of tin and learn the routes along which it moved from the Indies to the United States.
4. On a map of Asia locate Malaya, Burma, Thailand (Siam), and adjoining countries. Print names of bordering waters, important ports, and the chief products. Locate the Burma Road and tell of its importance to China.

PART SIX. LANDS DOWN UNDER

UNIT XVIII. BRITAIN'S REMOTEST POSSESSIONS

AUSTRALIA IN A WORLD AT WAR



AUSTRALIA—HEADQUARTERS OF THE ALLIED FORCES IN THE SOUTH PACIFIC

The island continent. Australia is a continent with but few mountains. The so-called Dividing Range separates the great interior plain from the coastal area on the east. This plain has many interior drainage areas resulting in salt lakes and basins. The Murray is the largest river in the continent. Its vast open basin is the most valuable portion of the interior plain. The continent lies wholly in the southern hemisphere with the northern half in the tropics; the southern half has a temperate climate. It is often called the "Land Down Under."

The most serious drawback to Australia's development is the ex-

tensive area of arid country, the greater part of the interior plain being a desert, often called "the dead heart of Australia." The continent lies largely in the belt of the southeast trade winds. The mountains on the eastern border intercept these winds, thus causing heavy rainfall on the eastern slopes. West of the mountains the rainfall gradually decreases for several hundred miles until extremely arid conditions prevail. The northern part of the continent is visited by the equatorial rain belt during the spring and summer of the southern hemisphere.

The large island of Tasmania lies off the southeastern coast and is an important part of the dominion. Australia itself has an area but little less than that of the United States.

The people. When the Europeans first came to Australia, they found there a dark-skinned people, the Australian *bushmen*, one of the most primitive races of the world. They live chiefly by hunting and fishing. For a number of years Great Britain used Australia as a penal colony. Then regular settlements were established and British immigrants came in large numbers. The present population is distinctly English. Northern Australia is too hot to be developed by people of the white race. Chinese, Japanese, and other Asiatics would gladly come in to do the necessary work, but the British are not willing for other races than the white to become citizens of the dominion. The people have gathered mainly in the eastern and southeastern section of the country. The population was estimated to be 7,137,000 on January 1, 1942.

While British in their origin, the Australian people are like Americans in many ways. They are vigorous and energetic and enjoy all kinds of sports. They are progressive and up-to-date in every way. Their business enterprises are thriving and expanding. Their social life is active and democratic. Their educational standards are high, their political policies are modern and effective, and their general standard of living prosperous. Americans have always enjoyed visiting Australia, and at present many thousands of our men are there in the armed forces. The relations of our men with the people of Australia are very cordial. This fact aids very much in the effectiveness of the combined efforts of the two countries against the common enemy Japan. Australians make excellent soldiers, and they have already done great service all over the Near and Far East. Although its navy is small, Australian warships have also been active in the eastern naval campaigns.

Wool and fur. Australia is the leading wool-producing country



Photo from Keystone View Company

A wool truck and trailer arriving at a port in New South Wales. Sheep are raised on the semi-arid lands to the west of the eastern highlands. In times of drought sheep die by the millions.

of the world. Sheep products—wool, hides, mutton, and lamb—constitute the country's largest source of income. More than 116,000,000 sheep are raised in the dominion. These give an annual wool crop of more than 1,000,000,000 pounds. Most of the sheep are the wrinkled-skinned, heavy-fleeced Merinos with wool of highest quality. These animals have been so improved by the Australians that the weight of each fleece has been increased by several pounds. Wool production is far more important than mutton production in Australia.

The country for several hundred miles west of the eastern highlands is too dry for profitable agriculture, and this area and another in the extreme west are used chiefly for sheep-raising. These lands were formerly held in large estates sometimes comprising even millions of acres. The ranches now are much smaller. Ranches are fenced in by wire to confine the sheep and to keep out dogs and rabbits. Rabbits were brought to the country by the English as pets, but they have increased to such an extent that they have become pests. They eat so much of the grass that they seriously reduce the food supply for the sheep. However, they have some value. Their fur, skins, and meat are now among the profitable exports of both

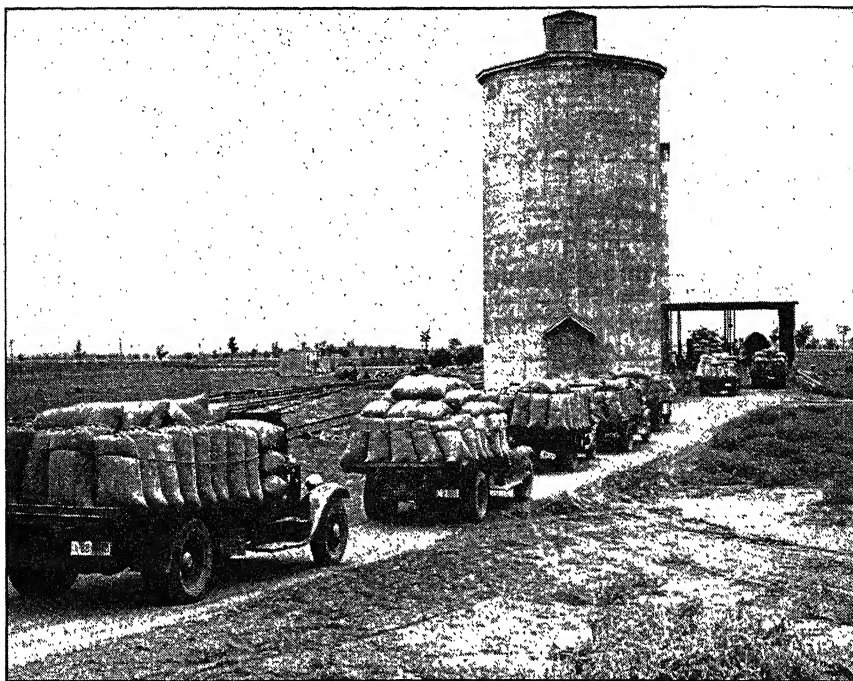


Photo from Black Star

A large tank for storing wheat in New South Wales. The wheat exported from Australia goes largely to Britain. Before World War II it was shipped in sailing vessels.

Australia and New Zealand. The fur called *lapin* is extensively used in the manufacture of felt, as well as of fur coats.

In normal times Australian wool goes to all countries manufacturing woollen goods of the finest quality. Great Britain has been the principal importer, but we bought much Australian wool both from the dominion and from Great Britain as reexports.

Beef and dairy products. Australia is noted for fine beef and dairy cattle. These are raised in the well-watered areas of the east and southeast between the mountains and the sea. Dairying is carried on mainly in the southeastern part. In the north cattle are raised mainly for beef and hides. Beef and dairy products formerly found their chief markets in the mother country, but are now entirely used at home.

Crops. It should be remembered that the Australian crops are grown in our winter months and can be offered in our markets in our spring or early summer. As far away as Australia is from us, the crops are not very unlike our own. Wheat, oats, hay, sugar cane, apples, and grapes are raised there.

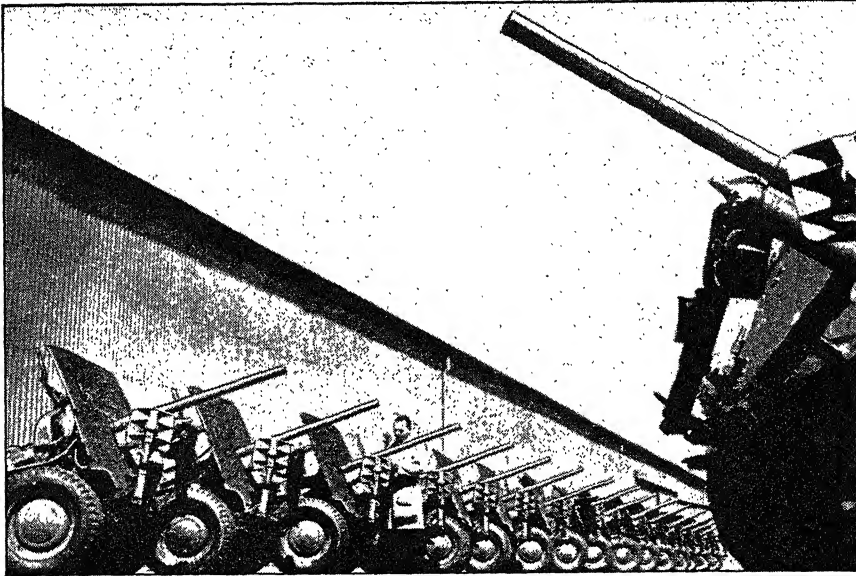


Photo by Owen from Black Star

Australia's antitank guns. This is the smallest field gun used by the army and requires nearly 4000 precision-made parts. Every month hundreds of these guns come off the assembly line of one Australian factory.

Australia has been one of the important wheat-exporting countries of the world. Several other countries produce more, but the small home consumption makes a large export possible. Modern machinery like our own is used in planting and harvesting and threshing the grain.

Hay, which is used as food for dairy cattle, is a highly important crop. Alfalfa and unripened oats are also used as fodder.

In northeastern Queensland where the climate is warm and moist, sugar cane is grown in amounts sufficient for home supply. With cheap labor tropical Australia could doubtless be more highly developed.

Australian fruit is harvested and ready for market in our spring when northern fruit is scarce. Apples are grown abundantly in Victoria and in Tasmania, which is a state of Australia. Grapes of high quality are grown in Victoria, South Australia, and in the country about Perth in the west. Raisins and wines are made from these grapes. Bananas, pineapples, and coconuts grow abundantly in the north.

Minerals. Australia has considerable mineral wealth in coal, iron, lead, zinc, copper, silver, and gold. The principal coal fields are in New South Wales not far from Newcastle. The iron ore comes

chiefly from South Australia. It is shipped to New South Wales for smelting.

With an annual production of nearly \$50,000,000 worth of gold Australia may still be regarded as an important gold-producing country although the present output is much smaller than it was a generation ago.

Industries born of war. Although Australia is primarily an agricultural and pastoral country, it has developed a strong industrial system under the stress of war needs. Until the first World War there was very little manufacturing in Australia. The continent sold vast amounts of food and raw materials, mostly to the United Kingdom, and bought its manufactured goods with the proceeds. The only manufacturing was confined to textiles, clothing, furniture, food products, and other light consumer goods.

The shortage of ships from 1914 to 1918 forced Australia to begin supplying some of its own industrial needs. A good supply of iron and steel is available, and the steel industry was started at Newcastle in New South Wales, near the coal fields. From this beginning there has sprung a large iron and steel industry which is now of great importance not only to Australia itself, but to Great Britain as well. With shipping so much restricted by submarine warfare, Australia has had to supply most of its own industrial machinery, ships, railroad equipment, tanks, planes, and heavy armament. To do this it has had to train skilled mechanics and to expand both its plant facilities and its stock of raw materials. Such manufactures as wool textiles, clothing, and electrical appliances have kept pace with the rapid growth of the heavy industries. Not only is Australia supplying most of its own needs, but it is also able to send planes and guns to other theaters of war. Melbourne is the chief textile center and Sydney the center of the metal industries. It is quite probable that after the war Australia will be able to convert its war plants to peacetime uses.

Latest information is that Australia has 800,000 troops under arms, and sixty-eight per cent of the population between 14 and 65 either under arms or in war work. Twenty-five per cent of the workers in war factories are women, and workers supplying civilian needs have been reduced sixty-five per cent. Thus another great country has geared its industries to the uses of war.

Commercial cities. *Sydney* is the metropolis of the dominion and ranks third in population among the cities of the British Empire. It is located on the eastern coast of New South Wales. It has a



Photo by Owen from Black Star

Australia at war. A corner in a factory where aerial bombs are made. This factory like many in our own country formerly made a peacetime product.

remarkably fine harbor which accounts, in the main, for the city's importance. It was the first British settlement made in Australia. It is the dominion's leading wool market and an important steel center. *Melbourne* is the second largest city in the country. Flour, leather, woolens, and furniture are among its leading manufactures, and it has great war plants. *Adelaide* is the natural outlet of the Murray-Darling basin. It ships meat, wool, hides, dairy products, and wheat from that important area. Slaughterhouses, electric plants, and waterworks are owned and operated by the city. Government ownership and operation of many lines of business is characteristic of Australian cities and states. *Brisbane* is the most northern of the important Australian ports. Its nearness to coal fields and its location upon a small navigable river are essential elements in its growth. *Canberra*, the federal capital and seat of government since 1927 is a city whose plan was designed by an American, W. Burley Griffin.

Railroads. Australia has 27,000 miles of government-owned railroads. Separate railroad systems serve the individual ports, and each system has its own gauge, or track width, which makes it necessary to change cars when freight goes from one system to another. This is an unnecessary expense and a distinct hindrance to domestic com-



Courtesy Australian News and Information Bureau

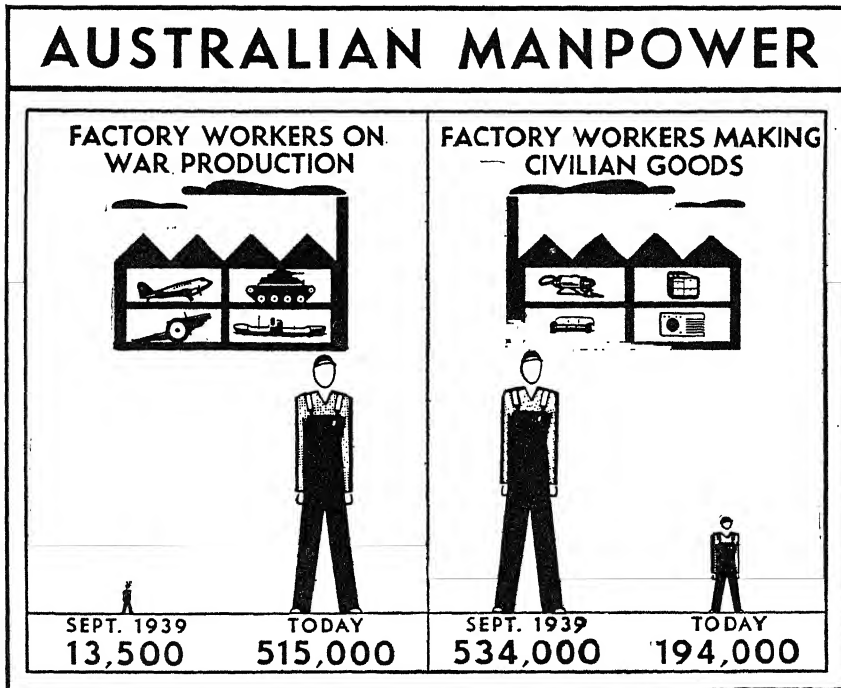
A convoy stops for a spell in the so-called "dead heart of Australia," on the new road from Alice Springs to Darwin. The great rocks shown in the background are known as "The Devil's marbles."

merce. Now a transcontinental railroad spans the southern portion of the continent. Other roads supply the more densely settled regions in the east and an area about Perth in the southwest.

Under the stress of war needs over 5000 miles of new strategic highways have been built. The best known of these projects is the truck road across the North Australian Desert connecting with the railroad to Darwin, on the north coast. This tropical town is the site of a strong air and naval base directly facing the East Indies and hence valuable in the defense of Australia from Japanese invasion.

Ocean routes. Ships going west from Australia have two available routes. One is through the Indian Ocean, Red Sea, Mediterranean Sea, Strait of Gibraltar, and thence to their destinations. This route has been closed until recently by the Axis menace in the Mediterranean. It is the shortest way to Europe. The second route is around the Cape of Good Hope and up the west coast of Africa, thence either to Europe or America. A third route much used now is across the Pacific eastward to California or through the Panama Canal. Whichever route is taken, Australia is very far from its markets and sources of supply. Cargoes must travel almost halfway around the world.

Our soldiers, sailors, and marines in the war area of the South Pacific must be constantly supplied with food, ammunition, medi-



Courtesy Australian News and Information Bureau

cines, and equipment. Most of this material goes by sea. From San Francisco to Australia is a voyage of over 8000 miles and requires about three weeks to complete it. Supplementing our ocean supply line, the Army Transport Command operates an airplane transport service that carries key military personnel, spare aircraft engines, medical supplies, and other urgent equipment. A Liberator Express recently flew from Australia to the United States in the record-breaking time of 33 hours and 27 minutes. When swifter planes fly the global skyways after the war, this record is certain to be broken. Thus Australia moves in closer to the rest of the world.

Australian worries. Even in normal times Australia suffers from a labor shortage on its farms and ranches. There is a strong prejudice against the immigration of workers not of the white race. This has kept up the wage standards in the continent, but it has retarded the development of the tropical north in particular. The Australians are glad now that there are few Japanese on the continent.

With the increased need for men both in the armed forces and in the rapidly growing war industries, the manpower shortage is very acute. Whether the end of the war will change this labor shortage



Photo by James Savaders

A coöperative dairy in North Island, New Zealand. At times New Zealand has led all other countries in the production of cheese.

to a labor surplus remains to be seen. Australia like all other nations at war has a manpower worry as well as a postwar worry about re-employment of soldiers and war workers.

But Australia's greatest problem at present is that of survival. It is directly in the path of Japanese conquest and is one of the most critical points in this global war. The United States and Great Britain are doing all in their power to protect this farthest outpost of white supremacy.

NEW ZEALAND

The dominion. New Zealand, like Australia and Canada, is a self-governing dominion of Great Britain. It lies about 1200 miles east of Australia and consists of two large islands—North Island and South Island. It is even more isolated than eastern Australia. It is about as far south of the equator as the northern half of the United States is north of it. Its climate is therefore temperate though the winters are somewhat warmer than in the United States because of the insular character of the country. Both islands have high and beautiful mountains as well as extensive lowlands well suited to agriculture. The northern island has volcanoes and hot springs.



Photo by James Sawders

Hauling kauri logs with eight yoke of oxen. Before the war the annual export of kauri gum exceeded 3000 tons.

Some of the mountains on the western side are snow-capped throughout the year and are known as the Southern Alps. The area is only a little greater than that of Colorado and the population is about fifty per cent greater than the population of that state.

Animal industry. New Zealand, like Australia, raises many sheep and cattle. The cool, rugged land in the south is well suited to the wool-producing Merino while the big mutton-producing Southdown does well in both the north and the south. More than half of the wool goes to England and wool is New Zealand's leading export in peacetimes.

In New Zealand, as well as in Australia, the rabbit while a pest is a source of income, as more than \$3,000,000 worth of skins are sold in some years.

Butter and cheese are produced in great quantities. Before the

war New Zealand was second only to the Netherlands in the amount of cheese produced. The first cattle brought into the country were used wholly for beef and hides. Today, however, the finest dairy cattle are being bred. The most up-to-date methods and appliances are used to improve the quality and reduce the cost of the products. New Zealand's dairy products rank high in foreign markets when they can be exported.

Kauri pine. This is New Zealand's most valuable forest tree. It has been cut so much that it is becoming scarce. The tree grows to an enormous size, makes an excellent quality of lumber, and furnishes a gum of great value in making varnishes and linoleums. The resinous gum of ancient kauris is now dug from the ground as fossil gum and is as valuable as the recent product. Great lumps weighing nearly 100 pounds are sometimes found but the pieces are generally of much smaller size. When found, it looks much like amber. This substance is highly valued but it is becoming scarce as the years pass.

Products and trade. The manufactures are almost wholly those of the dairies and packing houses. It must be remembered that these products must go through the tropics on their long journey to market so that cold storage is necessary to these shipments. Coal and gold are mined in sufficient quantities to export. In normal times New Zealand's chief exports are wool, frozen meats, hides, and dairy products. Hay, wheat, oats, and potatoes are raised extensively for home consumption. The five leading imports have been automobiles, petroleum, petroleum products, clothing, and tea. Auckland and Wellington are the chief ports. The railroads are nearly all government-owned as in Australia.

New Zealand in the war. This dominion, even more than Australia, has been dependent on the outside world for its manufactured articles. It has some coal but very little other mineral wealth. The principal industries have always been connected with the processing of food products and textiles. There has been some furniture and other woodworking industry. The population is too small to admit of much further industrial development. However war factories have increased to some extent. Light munitions are produced and small ships are built.

It is said that one sixth of the entire population of 1,640,000 are in the armed forces. The New Zealand Air Force alone has over 30,000 men, and New Zealand ships are active in the Pacific. New Zealand like Australia has one vital problem: to survive as a free dominion in this total war.

GUIDES TO STUDY

1. Why are we interested in Australia?
2. In what part of the country do most of the people live? Why?
3. Why have few Asiatics immigrated to Australia?
4. Why are our armed forces in Australia?
5. What conditions have caused Australia to lead all other countries in wool production? Where does this wool find its best markets? Why?
6. What are Australia's chief crops? Why are they grown in our winter months?
7. How do the fruits of northern Australia differ from those of the southern part of the country?
8. Why are not Australia and New Zealand among the leading industrial nations?
9. How has the war stimulated Australia's industries?
10. What means are the Australian people using to win the war against the Japanese? Why are they particularly interested?
11. What transportation facilities connect Australia with the rest of the world?
12. What are some of Australia's problems?
13. Describe the physical features of New Zealand.
14. What are the chief occupations of the people of New Zealand? Why?
15. What is kauri gum and of what use is it?
16. How are the manufactures of New Zealand related to its farms and ranches?
17. Where are the best markets for New Zealand's products? Why?

TOPICS FOR CLASS DISCUSSION

1. The discovery and settlement of Australia.
2. Tasmania.
3. Rabbits, a pest and a profit.
4. Jams for an English breakfast.
5. Newcastle, England—Newcastle, Australia.
6. The native animals of Australia.
7. The "dead heart of Australia."
8. The dairy industry of New Zealand.

WORK TO BE DONE

1. How did the native inhabitants of Australia differ from those of New Zealand? How have they differed in later development?
2. On a map of the world trace the routes taken by the products of Australia and New Zealand to their foreign markets. How are these countries handicapped?
3. On an outline map of Australia and New Zealand indicate the regions noted for cattle, sheep, grains, and fruit. What advantages has each region for its product?
4. On the same outline map locate the chief cities of each dominion. For what product or industry is each city important?
5. What is the meaning of the names Australia and New Zealand?

PART SEVEN. AFRICA—AN AIR- AGE CROSSROAD



Photo by James Sawders

A sheep market in Algeria. In all of North Africa the areas near the Mediterranean have rainfall sufficient for agriculture. Farther from the coast where the rainfall is lighter sheep and cattle are raised.

UNIT XIX. A CONTINENT FREED FROM THE AXIS MENACE

Africa—the dark continent. The land mass of Africa is really an extension of the land forms of Europe and Asia. During long geologic periods it was connected with them by broad isthmuses. Yet, notwithstanding its nearness to Europe, Africa today is still to a large extent an unknown land. Why is this so? The northern part is largely a forbidding desert, the central part is a tropical jungle, and the greater part of the continent is a high plateau with its rim near the coast. There are several large rivers in Africa, but many of them have steep falls near their mouths or along their courses, making exploration by river routes almost impossible. With

the exception of southern Africa and parts of coastal north Africa the climate is difficult for the white man. The early voyagers on their way to India usually stopped just after rounding the Cape of Good Hope to take on supplies of wood and water or to make repairs to their vessels. No attempt at colonization was made, however, until after a shipwrecked crew was stranded there for several months. Their report of the region was so favorable that the Dutch East India Company organized a settlement near Table Bay (the harbor of Capetown) in 1652. This was the beginning of Dutch influence in Africa.

1. NORTH AFRICA—A SPRINGBOARD FOR THE ALLIES

The Sahara. The outstanding physical characteristic of North Africa is the Sahara. It was across the northern fringe of this desert that the Axis and Allied armies moved back and forth through intense heat and drifting sands until they came to grips in the hills of Tunisia.

This great desert occupies a large section of northern Africa. It is about the size of the continent of Europe. The surface is somewhat diversified. Huge areas are vast wastes of sand that shifts and drifts almost like the waves of the ocean. Some of the dunes are three or four hundred feet high. The sand contains all the mineral elements necessary for growing vegetation. All that is lacking is water. In the valley of the Nile where irrigation is carried on, abundant crops are raised. The region lies in the northeast trade-wind belt. These winds are warmed as they blow toward the equator; so their capacity for holding water is increased. The surface here being comparatively level there are no highlands to force the winds to higher altitudes, compelling them to give up their moisture in the form of rain.

Oases are fertile spots in the desert fed by underground waters which have their sources in distant highlands. Since water is always seeking ocean level, it seeps out in various hollows in the desert giving life to groves of date palms and oranges and to other tropical vegetation. The oases made possible the caravan routes of the desert.

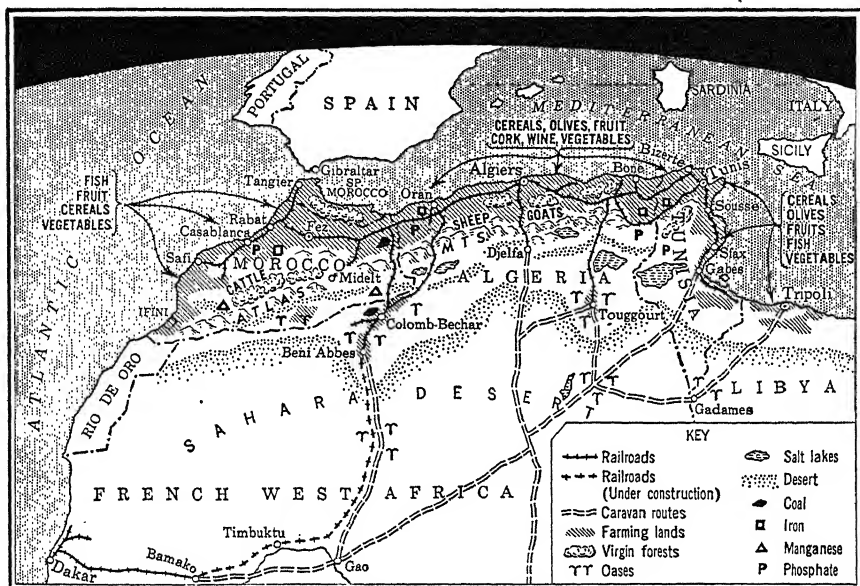
Our interest in North Africa. Ever since November 7, 1942, when the combined American and British forces landed in North Africa, that part of the African continent has been very much in the American mind. The landing operations took place in Morocco and Algeria, French possessions, but controlled by the Vichy govern-

ment. Consequently the invaders for a time met with some resistance from the French. Within four days, however, Rabat and Casablanca, in Morocco, and Oran and Algiers, in Algeria, were in Allied hands. Shortly afterward American, British, and French forces started eastward for Tunisia, another French possession, where they planned to meet the British Eighth Army which was driving Rommel, "the Desert Fox," westward across Libya, an undertaking which worked out "according to plan." It was in Casablanca that President Roosevelt and Prime Minister Churchill held a famous conference to plan the further prosecution of the war.

The fall of Tunisia. The defeat of the Axis in Tunisia, their last stand in North Africa, had far-reaching consequences. Dakar was no longer in danger of coming under the control of Hitler; Egypt and the Suez Canal were no longer seriously threatened; Southern Europe was now open to attack by the Allied forces; and the pressure on the Russian front was lessened. The Mediterranean was again open so that ships sailing to the Near East with men and supplies for the Allied armies or for aid to Russia were no longer obliged to sail around Africa; the length of their voyage thus was cut in half. Hitler was unable to intimidate the French in North Africa; neither could he longer obtain from that region food and metals, nor the phosphates so greatly needed to fertilize German farm lands.

The Barbary Coast. November 7, 1942, was not the first time that our armed forces had a duty to perform in North Africa. From the fourteenth to the nineteenth centuries the inhabitants of this region, then known as the Barbary Coast, were pirates, or "corsairs," who terrorized the coasts of the Mediterranean and the eastern Atlantic as far north as Iceland. They demanded and received tribute from all important sea-going nations including the United States. Crews and passengers of captured vessels were held as hostages or as slaves. It was not uncommon for notices to be read in American churches of church members who were held captive in some one of the Barbary States and for subscriptions to be raised for their ransom. At last our government decided to stand it no longer. There were six vessels in our navy, four of which were dispatched to deal with the outlaws. After a series of bombardments, Stephen Decatur, an officer in the United States Navy, succeeded in making a treaty with the Barbary States in 1815. Our country was the first to put a check upon their depredations.

The resources of North Africa. With the exception of fertile



Map of northern Africa showing the chief mineral and agricultural products that the Axis was deprived of when the Allies overwhelmingly defeated the German and Italian armies.

valleys and coastal fringes the whole stretch of North Africa from the Atlantic to the Nile is desert country on the northern border of the Sahara. The Atlas Mountains which rise to heights of 14,000 feet extend across Morocco and Algeria from east to west. Because they shut out the scorching winds of the desert from the south and condense the moisture of the ocean winds blowing from the west, the narrow coastal strip is relatively productive. In Morocco eggs and poultry are the chief products. In normal times some of these products are exported even to England. In Algeria grain, potatoes, grapes, olives, dates, and figs are grown. However, when the Allied occupation began, the whole countryside was greatly impoverished because of the Axis demands made upon France and its African possessions.

Tunisia, the battle ground where the final Axis stand was made, is the most productive region of all North Africa. Its mountain valleys are very fertile. In those valleys and in oases to the south grains and subtropical fruits are grown in abundance. While under Axis control, the lion's share of all these products were requisitioned for the use of the German armies or for consumption within Germany. Tunis, the capital and chief seaport of Tunisia, is near the site of the

ancient city of Carthage, the rival of Rome, and in its time one of the greatest commercial cities in the world.

Libya, an Italian possession, is the most barren stretch in the whole length of the North African Coast. It is more nearly allied to the great desert than any other country of this region. Near the coast it produces grains and fruits similar to those of Algeria. Further inland is a region adapted to grazing. Tripoli is the chief seaport.

2. EGYPT—GUARDIAN OF THE SUEZ

The gift of the Nile. This country in the northeastern corner of Africa is really a part of the Sahara. It has practically no rainfall, but it is traversed by the River Nile which has its source in the equatorial lake, Victoria Nyanza. The heavy periodic rainfall in its upper reaches causes the Nile to overflow its banks regularly. In this way the extremely fertile flood plains and deltas of the Nile have been built up. For six thousand years and more it has been the giver of life to people known as Egyptians. The flood waters begin to rise in June, reaching a peak of thirteen feet at Cairo in October. Several great dams regulate the flow of the river. The most recently constructed dam, finished in 1937, is about three miles long, the longest in the world. The basin system of irrigation still practiced in certain areas is the same system that was in vogue 6000 years ago. Water to the depth of several feet is admitted to an area and allowed to stand for five or six weeks. It is then drained off and the ground is seeded. Cereals, beans, and lentils are grown under this system. Ditch irrigation was introduced about a hundred years ago. The British have helped improve this system by the construction of a network of canals. Under this system cotton and sugar cane can be grown as well as vegetables and cereals. The season admits of two or three crops a year.

Cotton is raised chiefly on the delta of the Nile. The fiber is of the long-staple variety and therefore is in great demand. Egypt ranks fourth as a cotton-producing country. Before the war cotton, cottonseed, and cottonseed cake were the chief exports. Onions too were an important article of export. Since cotton is raised so extensively, Egypt normally is obliged to import large quantities of foodstuffs. Although cotton is the chief crop, there is practically no manufacturing carried on. Cotton goods were imported, chiefly from England. There are a few sugar refineries. Cigarettes are manufactured for domestic consumption and some were exported.

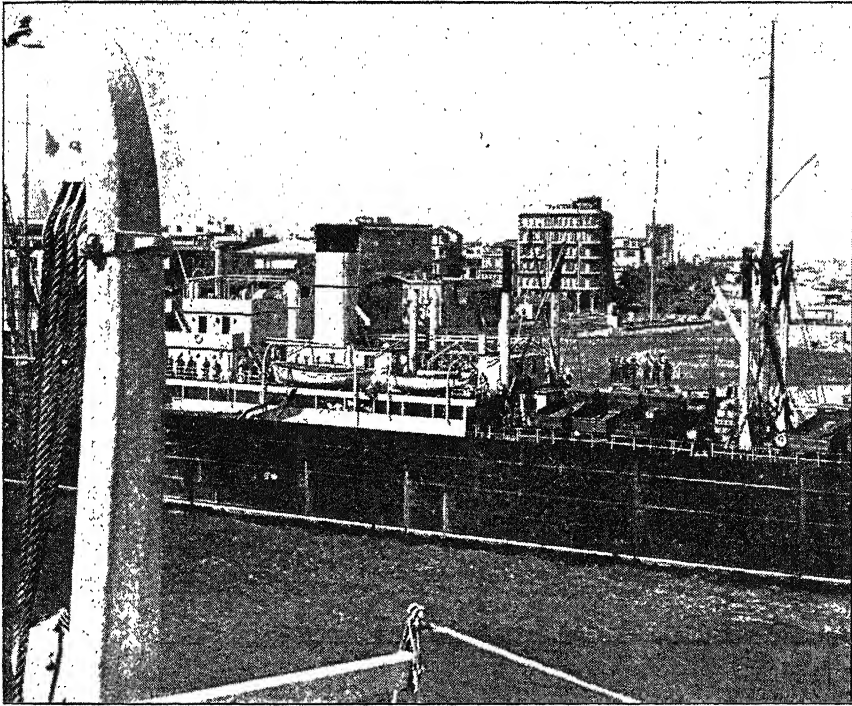


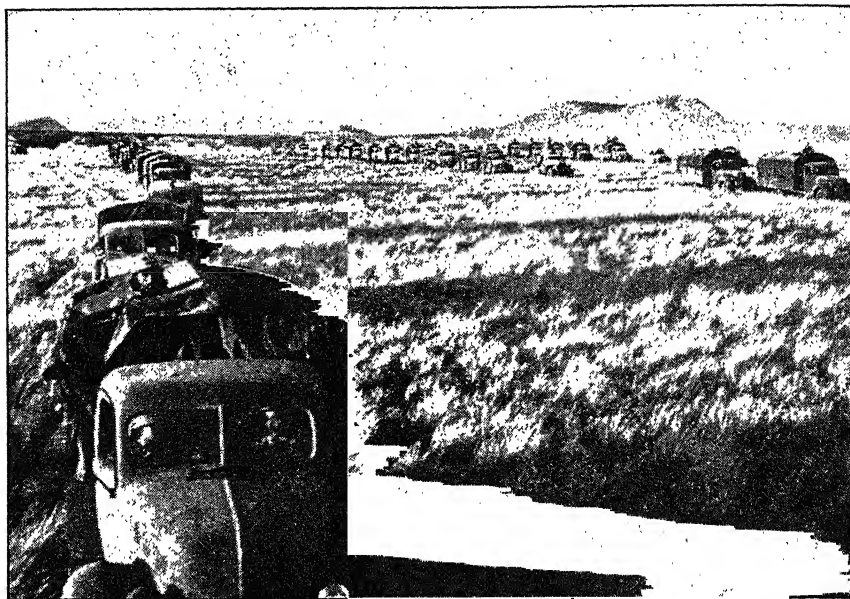
Photo by Henle from Monkmeyer

A transport passing through the Suez Canal at Port Said, Egypt, en route to Massawa

Alexandria, founded by Alexander the Great in 332 B.C., is Egypt's most famous Mediterranean seaport and one of the world's important cities. Cairo, the capital of Egypt, is much the largest city in Africa. The present Cairo is at least the fifth city built upon its site. It is in many aspects a modern city. Port Said, at the Mediterranean end of the Suez Canal, is important commercially and as a port of call. Much of Egypt's cotton was exported through this city and vessels of all nations coaled there before the war.

Home rule. Egypt, long under the control of the British government, is now free of British domination and occupation except for garrisons maintained for the protection of the Suez Canal. The British also have the right to use Alexandria and Port Said as naval bases in case of need and in the event of war to move troops over Egyptian territory.

Saved from invasion. For months preceding the defeat of Rommel's army in North Africa, Egypt was in grave danger of capture by the Axis forces. Their armies stood at Egypt's very door. Previous to this time Crete had been captured by the Germans, thus giving



Courtesy South African Public Relations and Information Office

Opening phase of the attack against Ethiopia and Italian Somaliland. A South African motor convoy crossing the desert with supplies.

them a base only 150 miles from Alexandria. Syria, where British forces are also stationed, is not much farther from Crete.

Had Egypt been captured it would have been a major blow to the Allies. The Axis partners would have got big supplies of cotton of which they are in great need. They would have obtained too a small amount of oil and small quantities of food. But of far greater consequence would have been Axis control of the Suez Canal, the route to the oil wells of Iran and the road to India where the Germans and Italians would have been able to join forces with the Japanese.

Control of Egypt and the Suez would no doubt have resulted in the exclusion of all Allied ships from the Mediterranean. The possible invasion of Egypt has been likened in importance to the surrender of Singapore or the fall of France. Egypt has witnessed many invasions, but none would have compared in world-wide significance with an invasion by the Axis Powers.

ANGLO-EGYPTIAN SUDAN

The Sudan is that part of Africa lying between the Sahara on the north and the equatorial forests on the south. The Anglo-Egyptian Sudan is that portion of the Sudan which lies directly south of Egypt.

As its name implies this colony is jointly controlled by Egypt and Great Britain and flies both the Egyptian and the British flags. Its northern portion lies in the great Libyan Desert, and its southern portion in the tropical jungle. It is in the heart of this colony that the Blue Nile and the White Nile unite to form the River Nile. This portion of the Sudan is a grassland having two seasons, one wet and one dry. Agriculture and grazing are the chief occupations. By the aid of irrigation long-staple cotton is grown in the north. Great Britain looks to this region for much of its supply of raw cotton, and hence is ready to supply the capital needed to build irrigation dams to insure the crop.

The world's supply of gum arabic comes from the forests in the south. The gum, which is an exudation on the bark of a tree, is of great commercial importance. It is widely used in the finishing of paper and textiles, in medical prescriptions, and in the making of candy, mucilage, and ink. Dates are raised and dried for local consumption. Some are exported to Egypt. Egypt also looks to the Sudan for its meat supply.

3. ETHIOPIA—FREED FROM ITALIAN RULE

Free once more. Ethiopia, the first country to reap the fruits of an allied victory, is free once more. Before its ruthless conquest by Italy, its ruler, Haile Selassie, with the assistance of foreign advisors, was doing much to develop the resources of the country and to bring the benefits of civilization to his people.

The surface of the country, which lies just north of the equator, is a plateau broken by irregular mountain ranges. Because of the elevation the climate, except in the river valleys, is fairly moderate. Agricultural resources are undeveloped. Small quantities of grain, cotton, coffee, and sugar cane are raised. The country is known to possess varied mineral deposits but as yet only gold, platinum, and potash have been produced in commercial quantities. A wealth of water power is waiting to be tapped some day. There is only one railroad in the country; it connects Addis Ababa, the capital, with Jibuti and is less than 500 miles long. The Romans have always been road builders. True to that tradition the first project to be undertaken by the Italians when they occupied the country was to change its donkey trails to surfaced roads—5000 miles of them. They are the one and only valuable contribution the Italians made to the country.



Courtesy South African Public Relations and Information Office

Inspecting and counting booty captured from the Italians in Ethiopia where, crushing all resistance, the South Africans advanced 1725 miles in 53 days.

4. BRITISH EAST AFRICA—LAND OF BIG GAME

Uganda, Kenya, and Tanganyika are grouped in this territorial division of Africa. It is bordered by the Indian Ocean on the east and is directly crossed by the equator. In the heart of this region is Victoria Nyanza, the source of the Nile. Because of its location and climate it is inhabited chiefly by native colored races and Asiatics.

The lowlands bordering the coast have a hot, moist climate well adapted to the growing of sugar and coconuts. Much copra was formerly exported. In the interior there is an extensive plateau having an altitude of over 4000 feet. Although the plateau is crossed directly by the equator, because of its elevation it has a climate much like that of California. This region is better adapted than any other part of central Africa to the life of the white man; yet it is at present a wilderness abounding in game and occupied chiefly by roving tribes. Corn is grown for native consumption, and some cotton and sisal have been raised for export. Sisal was introduced from Mexico. It has been claimed that enough cotton could be grown here to supply all of Britain's needs if the natives could be induced to apply themselves to regular work. Like so many primitive peoples the men are



Courtesy South African Public Relations and Information Office

Planning and plotting the next move. South African armored cars engaging in daring patrol work in the East African campaign.

content to leave the routine drudgery of providing a living to their womenfolk.

Big game. Although western Tanganyika is sometimes referred to as the *gorilla country*, the elephant and many other kinds of big game abound there. It is a happy hunting ground not only for the natives, but for hunters from all over the world as well. Some ivory was formerly exported from this region. For many years the ivory exported was secured from elephant "cemeteries" where the old and sick elephants had withdrawn to die. Today about fifty per cent is secured from animals that are slaughtered chiefly to restrict the size of the herds. Tons of feed are consumed by them in the course of a year; so, as settlements grow, it is very necessary to limit their number. Civilized man has always appreciated the beauty of ivory, fashioning it into objects of use and adornment. It is now used chiefly for toilet articles, chessmen, billiard balls, and piano keys.

Off the coast lie the islands of Zanzibar and Pemba, islands which might reasonably be called *spice islands* since four fifths of the world's supply of cloves is grown there. The clove tree was introduced into the islands from the East Indies more than 100 years ago. It is said that travelers detect the odor of the flowering trees long

before their ship brings the islands into view. These islands were once the trade centers for the entire coast of East Africa. In recent years the trade has been transferred to Dar-es-Salaam and Mombasa where railroads from the interior meet ocean-going ships. Before the days of the railroad small boats carried commodities from the mainland to the islands, then the ports of call for large ships.

MADAGASCAR

Madagascar, one of the world's large islands, is a French possession temporarily in the hands of the British. Lying as it does off the east coast of Africa its occupation by the Japanese would have been a distinct threat to the sea routes of the Indian Ocean and a menace to South Africa. Its occupation by the British was a necessary strategical step in this global war. The island has a mixed population of over 3,500,000. It produces the typical tropical crops: rice, cotton, sugar, and tobacco as well as vanilla and cloves. Graphite is an important mineral. It also yields some gold, coal, copper, mica, and precious stones.

GUIDES TO STUDY

1. Why was Africa for so long a time an unknown continent?
2. What are the outstanding features of the Sahara?
3. Tell of the work of American forces in North Africa.
4. What were the effects of the fall of Tunisia?
5. Tell of an earlier visit of our navy to the Barbary Coast.
6. What supplies did the Axis Powers lose when they were forced out of North Africa?
7. Why has Egypt been called the "gift of the Nile"?
8. When and why does the Nile overflow its banks?
9. What does artificial irrigation do for Egypt which the natural overflow of the river could not do?
10. The Old Testament tells us that Joseph's brothers came to Egypt to buy grain when there was a famine in their own land. Why was there plenty in Egypt when there was famine elsewhere?
11. Why is Britain deeply interested in Egypt?
12. Why have the British built dams in Egypt and in the Anglo-Egyptian Sudan?
13. What would the loss of Egypt to the Axis mean to the Allies?
14. What is the Anglo-Egyptian Sudan? Why is it so called? What are its products?
15. Of what value was Ethiopia to Italy?
16. Why is East Africa one of the best parts of the continent for the white man? What crops brought from other lands are raised very successfully in East Africa?

17. Why are elephants hunted in East Africa?
18. Why did the British occupy Madagascar?

TOPICS FOR CLASS DISCUSSION

1. Oases.
2. The pirates of the Barbary Coast.
3. The climate of North Africa.
4. The sources of the Nile.
5. Ethiopia and Haile Selassie.
6. The islands of Zanzibar and Pemba.

WORK TO BE DONE

1. Learn about the pirates of the Barbary Coast and report to the class.
2. Describe the climate, soil, and surface of Libya and then tell why Mussolini wanted other African colonies in addition to Libya.
3. Learn the story of the building of the Suez Canal.
4. Find out what contributions the Italians made to the development of Ethiopia.
5. If you wanted to hunt elephants, tell what would be your route and method of travel from your home, where you would go, and, if successful, what you would bring back.

5. BRITISH SOUTH AFRICA—A LAND OF GOLD AND DIAMONDS

With the exception of Mozambique British South Africa occupies the whole southern part of the continent. The Union of South Africa has a dominion status in the British Commonwealth of Nations. It is made up of four provinces: the Orange Free State, the Transvaal, Natal, and the Cape of Good Hope. South-West Africa, another of Germany's lost colonies, is mandated to the Union of South Africa. Rhodesia and Bechuanaland lie north of the Union of South Africa. Northern Rhodesia is a Crown colony, Southern Rhodesia is a self-governing colony, and Bechuanaland is a protectorate. As this portion of Africa lies almost wholly within the temperate zone, it is peopled by a larger proportion of Europeans than any other part of the continent.

The veld and the bush. From a very narrow coastal margin the surface of South Africa rises in a succession of hills separated by barren wastes until an elevation of a mile and more is reached; then it extends north in a vast plateau. Portions of this plateau consist of grassy rolling prairies, known as the *veld*; other parts are covered with a growth of scrubby trees, known as the *bush*. This continental plateau is higher in the east than it is in the west. Lying as it



Photo by James Sawders

The estate of Cecil Rhodes, Cape Town, South Africa. Cecil Rhodes did more than any other man to develop the resources of South Africa and to add to the British possessions in that part of the world.

does in the belt of the south-east trade winds, the eastern highlands of this region have a heavy rainfall which becomes much lighter in the west.

The Great Karroo. Grazing is a very important industry on the semiarid uplands where the *karroo*, a low, scrubby plant, grows luxuriantly in the wet season. Some portions of the terraced uplands near the coast are called the Great Karroo because of the abundance of this plant growing there. The karroo makes excellent pasturage for sheep, goats, and ostriches. The Union of South Africa formerly exported more

wool than any other country except Australia and Argentina. Breeds of sheep are constantly being improved by importation of animals from Australia and Europe. Herds of Angora goats are kept on the portions of the plateau that have too scanty a vegetation for sheep. The long, glossy Angora hair is extensively used in the manufacture of such pile fabrics as velour, plush, and imitation fur. South Africa leads in the production and export of Angora. Ostrich farming is also an important industry, the number of ostriches on farms in the Union being about 50,000.

Cultivated crops. Indian corn is the principal farm crop. It is raised chiefly by the natives for home consumption, but there has usually been a surplus for export. On the eastern lowlands there are many sugar plantations operated by Europeans. Some cotton and tobacco are also grown. In the lowlands and in the mountain-protected valleys much fruit is raised. As the seasons here are the reverse of those in the northern hemisphere, the crops mature when the demand is greatest. Pears, grapes, peaches, and citrus fruits have found a good market in European countries and even in the United States when their own supplies were exhausted. Some subtropical

plants, such as the pineapple, mango, and banana, are raised in the moist lowlands.

A shining industry. Until the year 1867 the chief industries of this entire region were farming and grazing. The settlers were principally Dutch (Boers). One day some Boer children were found playing with a pretty stone which they had picked up on their father's farm. It proved to be a diamond of the first water and sold in Paris for \$2500. From that day the whole history of South Africa was changed. The diamond rush was on. For many years South Africa led the world in diamond production. Tons of diamonds were produced. It still ranks high—many of the gems found there being of exceptional beauty and value.

The value of a diamond depends not only on its size and brilliance, but also on the purity of its color as well. The largest and most flawless stone ever found came to light in the Transvaal in 1905. It is named the Cullinan diamond from the name of its discoverer. It measured 4 by 2½ by 1¼ inches and weighed a little more than one and one-third pounds. Its surface indicated that it was only a part of a still larger crystal. It was cut into nine stones. One is in the scepter and another in the crown of the king of England.

In the alluvial lands of the Orange River and its tributaries diamonds are found. The diamonds are panned as gold is panned. This form of diamond mining yields comparatively few stones. It is the *dry diggings* that yield the largest returns. The dry diggings are circular or oval deposits of carboniferous shale, *blue earth*, which extend far below the surface in the pipes of ancient extinct volcanoes. A diamond, you know, is pure carbon crystallized. Some geologists believe that the crystals were formed in the shale by the heat of the molten lava; others believe that the crystals were formed far below the earth's surface and forced up from below by the force of the volcanic eruption.

Shafts are sunk and tunnels excavated beside these old volcanic pipes. The soft rock in the pipe is dynamited, brought to the surface, and spread out to weather. It is allowed to soften for several months. It is then put through washing machines to separate the diamonds and other stones from the debris. The stones are then passed over vibrating tables covered with grease, to which only the diamonds adhere. The yield is usually ten pounds of diamonds to 70,000 tons of blue earth.

Every possible precaution is made to prevent the theft of stones. The mines are surrounded by barbed-wire inclosures. The em-

ployees, chiefly native, are compelled to live within the inclosure during the period of employment. They are always under the watchful eyes of the overseers, and little opportunity is given for stealing a stone.

Kimberley, Pretoria, and Johannesburg are the chief diamond centers. The great diamond companies not only control the industry locally and regulate the prices in the world market, but they also exert a strong political influence.

The diamond put to work. We usually think of diamonds solely as articles of adornment. The demand for this purpose is very great, but it is not the chief use to which the precious stone is put. In addition to its brilliancy and beauty a diamond is also hard, the hardest substance known. It takes a sharp edge which is most useful in a cutting implement. For drawing metal into the form of wire diamonds are unsurpassed. It is said that 400 tons of copper can be drawn through a diamond die without enlarging the hole. Stones not suitable for gems are imbedded on the edge of a hollow cylinder to make a diamond drill for drilling rock and other hard substances. The widespread use of alloys in modern industry, especially in the manufacture of armaments, calls for a corresponding use of the diamond as an abrasive. Diamond abrasive wheels, in which diamonds or diamond dust is imbedded, drills, dies, and bits are widely used in this as well as in many other metallic industries. Diamonds used in this way wear out—slightly more than half must be replaced each year. Because of this fact there is a steady demand for industrial diamonds. In 1937 South Africa's diamond output amounted to 1,030,434 metric carats worth about \$17,000,000. Since the outbreak of the war production has fallen off.

The chief diamond-cutting centers of the world were Amsterdam in the Netherlands and Antwerp in Belgium. Diamonds always gravitate toward safety and security. In the Middle Ages they were taken to the Low Countries for safe keeping when the property of their owners, the Jews, was not safe in other lands. When the Low Countries, the Netherlands and Belgium, were invaded in World War II great quantities of diamonds were hidden and quickly removed to France and Britain. Eventually the most of them found their way to the United States, the place deemed safest and also the place where for years diamonds have had the greatest sale. In the few months following the German invasion ninety per cent of all Dutch and Belgian diamond dealers had come to New York bringing their diamonds with them. It is estimated that only \$7,000,000 worth

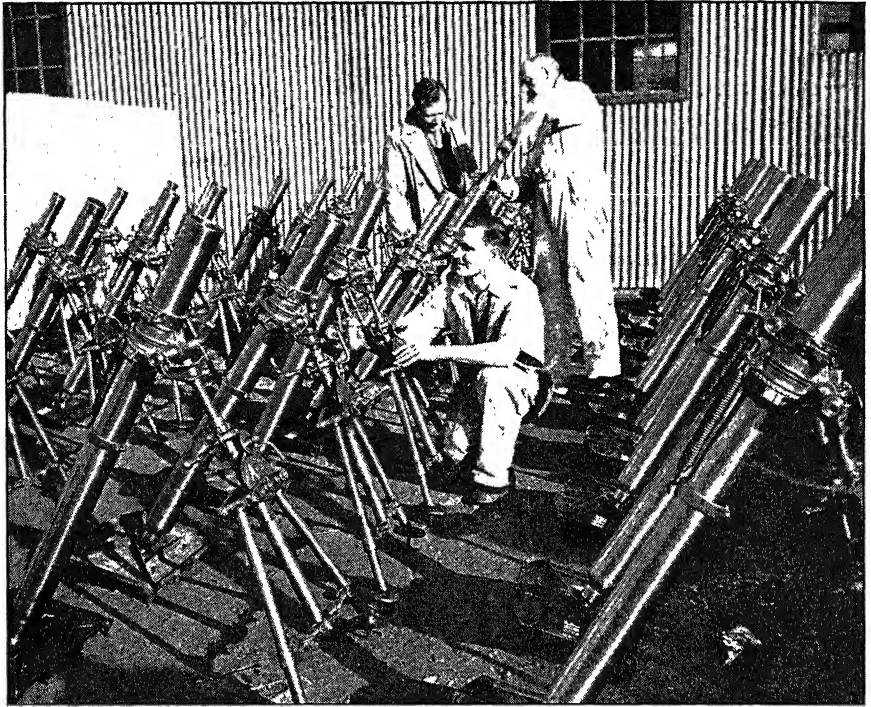


Photo from Triangle Photo Service

Surface working of a Rand gold mine in the Union of South Africa

of diamonds fell into the hands of Hitler. Today New York is the greatest diamond center of the world.

A trek that led to gold. A little over one hundred years ago (1836) descendants of the Dutch colonists in Cape Colony, dissatisfied with British domination, began their famous trek to the northwest, through a region later to become the Orange Free State and across the Vaal River into a region now known as the Transvaal. It was nearly fifty years, however, (1884) before gold was discovered in the great *Witwatersrand* (White Water Range), the richest gold-producing region in the world. The mines extend along the range for a distance of more than fifty miles and the combined length of all their shafts and tunnels would reach from the Cape to Cairo, the whole length of Africa. A quarter of a million men find work here. Coal is near at hand. This fact coupled with the abundance of cheap native labor gives a great impetus to the industry. Johannesburg is the center of the gold-mining area as it is also one of the diamond centers. Unlike the diamond the gold here is invisible, occurring in particles too small to be seen by the naked eye, yet the yield is so great that this is one of the most important gold-producing areas



Courtesy South African Public Relations and Information Office

Assembling a batch of mortars made in South Africa

of the world—producing annually about a third of the total gold mined.

Before the war the Union of South Africa had a world-wide trade. In the order of value the exports were gold, wool, diamonds, fruits, and hides and skins. Naturally the bulk of these exports went to Great Britain. Since a large number of Europeans live there, automobiles, petroleum, cotton goods, and wearing apparel were imported. The imports came from Great Britain, the United States, and Germany. Capetown, Port Elizabeth, East London, and Durban are the chief ports.

South Africa in World War II. South Africa is not an industrial country; yet it is doing its utmost to produce war equipment. It builds armored cars and manufactures artillery, rifles, bombs, shells, and other necessities of war. Its soldiers are to be found with the Allied forces in North Africa. The Union has twenty-four schools for training pilots. Its planes and patrol boats help to guard the sea route around the Cape of Good Hope.

Jan Christian Smuts, prime minister of South Africa, fought

against the British in the Boer War, but with them in World War I. He has great influence in the country and uses that influence in harmonizing the Union's divergent factions. He is one of the empire's outstanding statesmen.

6. WEST AFRICA—TERMINUS OF TRANSATLANTIC AIR LINES

That portion of Africa lying north of the Belgian Congo and extending from the Gulf of Guinea to Morocco and Algeria is commonly referred to as West Africa. Within this area lie Nigeria and the Gold Coast which are British possessions and Senegal, Ivory Coast, Dahomey, French Equatorial Africa, and French West Africa—all belonging to France. Mandated to Great Britain and France jointly are the Cameroons and Togoland, former German colonies. The coastal plains here are low and swampy. The interior is a part of the extensive African plateau. The coastal plains and the southern portion of the plateau are in the belt of heavy equatorial rains. The climate is hot and not adapted to the white man.

In the moist plains of the lowlands there are tropical forests. Mahogany, ebony, and wild rubber are usually exported. The oil palm, a tree prized by the native for the oil that it yields, grows in abundance. Much of its oil has been exported. This is the largest cacao-producing region in the world. Attempts are being made to establish cacao and rubber plantations, but here as in tropical East Africa it is difficult to secure competent labor. The tropical forests gradually merge into the grassy uplands of the Sudan where the natives carry on some agriculture and grazing. Millet, corn, rice, and cotton are grown here in quantities sufficient for home consumption and for export.

Gold Coast. As its name implies the Gold Coast is a coast and it does yield gold, but its coast is not extensive and gold is not the leading product. Early explorers gave it its name from the abundance of gold in the gravel along its riverbanks. The same river gravels now yield diamonds as well as gold. The diamonds are small, useful chiefly for cutting and abrading, but their export value is now exceeded only by that of the Belgian Congo and Union of South Africa.

The region is a dense tropical jungle which is difficult to tame. In places, however, the land has been successfully cleared and cacao and oil-nut plantations have been established. Cacao has been the leading export. The Gold Coast leads the world in its production.

Mahogany, ebony, and teak have been important exports, as has been manganese, so necessary in the manufacture of modern alloys which have been developed for special uses.

The Gold Coast has exported in the order of their importance cocoa, gold, and diamonds. Much ivory was exported from the Ivory Coast and neighboring regions. Senegal usually exports nearly half a million tons of peanuts annually.

BELGIAN CONGO

The Belgian Congo is situated in the heart of Africa with only a narrow corridor leading to the Atlantic Ocean on the west. It embraces practically all of the region drained by the Congo River and its tributaries. At the mouth of the Congo, which is navigable for about ninety-five miles, there is a fine natural harbor. Railroads have been built around the several falls; so the colony has an extensive system of communication and transportation. The upper headwaters of the river are in almost impenetrable tropical forests where wild rubber, cacao, and palm nuts flourish. Forest products, coffee, and ivory were prewar exports. There is a valuable deposit of copper in this colony and copper mining is the chief industry. Pitchblende, the ore from which radium is obtained, is also found here, not far from the copper deposits. The ore was formerly refined in Belgium and the yield was about two ounces a year. In recent years the Belgian Congo has become the world's greatest producer of diamonds.

LIBERIA

A Negro republic. Liberia, the first Negro republic in the world, was founded on the west coast of Africa in 1822 by Negro freedmen from the United States. It became an independent republic in 1847. Its capital, Monrovia, was named for our President Monroe. Its constitution was modeled after ours, but only persons of Negro blood and owners of land can vote. Of the population of 1,500,000 only about 100,000 can be ranked as civilized. The country which lies only a few degrees north of the equator produces some coffee, rubber, vegetable oils, and ivory. In 1926 Harvey Firestone, the American rubber manufacturer, was given a 1,000,000 acre concession by the Liberian government for the development of rubber plantations.

DAKAR

With the fall of France and the establishment of the Vichy government, the importance of the French colonies in West Africa began to take on a new meaning. The most important center of all was the port of Dakar in the French colony of Senegal on the westernmost projection of the hump of West Africa, near Cape Verde. Between Dakar and Natal in Brazil lies the narrowest part of the Atlantic. The distance from Dakar to London is 3500 miles, from Dakar to Lisbon 2300, but from Dakar to Natal it is about 1800, a flight of six or seven hours. These distances are in statute miles.

The Allies were greatly concerned for fear Dakar would come under the control of the Axis either by force or by bargaining with the Vichy government. Hitler in anticipation of such control with the use of enforced labor began the construction of a railroad from Algiers to Dakar. This road was authorized by Vichy.

Had Hitler gained full control of Dakar and had he been able to send troops and supplies by way of the railroad that port would have been a serious menace to both North and South America. As an air and submarine base it would have endangered all Allied shipping at the bottleneck of the Atlantic. It would have been an excellent outpost for aggression against Brazil and later other countries on these two continents. Fortunately this Axis dream was not realized. As a result of the defeat of the Axis in Tunisia and a friendly agreement with the French both in North Africa and in West Africa Dakar came under the control of the Allies.

In times of peace Dakar is a port of call for ships from Europe around Africa; also for ships from Southern Europe to South America. As a port of call it competes with ports of the Madeira and Canary Islands. Peanuts, the chief export of Senegal, go out through Dakar and other ports of Senegal.

American military leaders have established bases at various points along the West African coast. Planes carrying men and supplies from the United States by way of Natal land at these bases en route to Egypt, the Near East, India, or China. Bombers are ferried to these destinations over the same routes. Africa has long been referred to as the "dark continent." In the age of flight, just dawning, planes are passing over the densest jungles, the highest mountains, the most extensive deserts, and the widest seas. In the future no part of Africa or any other continent will be beyond the reach of man to explore, to develop, and to possess.

GUIDES TO STUDY

1. Of what does the Union of South Africa consist?
2. What are the products of the farms and grazing lands of the Union of South Africa?
3. Why do the fruits of South Africa find a ready market in the United States and Europe?
4. Where are diamonds found and how are they separated from the soil or rock in which they occur?
5. How is the diamond put to work?
6. How does gold occur in South Africa?
7. What part is the Union of South Africa taking in the war?
8. South Africa is one of the very few parts of Africa that are self-governing. How do you explain that fact?
9. Why have the British invested much capital in South Africa?
10. What possessions of Britain and France are included in West Africa?
11. What are the products of the tropical forests of West Africa? Of what use are they to the people of lands having temperate climates?
12. How do the products of the Belgian Congo compare with those of West Africa? What valuable minerals are found there?
13. Why were the Allies eager to gain control of Dakar?
14. What use are the Allied Nations making of Dakar?

TOPICS FOR CLASS DISCUSSION

1. The Boers in South Africa.
2. The diamond industry moves.
3. Gold in South Africa—gold in Fort Knox, Kentucky.
4. Radium.
5. Rubber plantations in Liberia.
6. Air lines from Dakar.

WORK TO BE DONE

1. Study a population map of Africa. Explain why there are many people in some parts and few in others.
2. Prepare a talk to give to the class on the Cape to Cairo Railroad.
3. Topics for other special studies: David Livingstone. Why was his heart buried in Africa while his body was buried in England? Write a brief story of his life. Who was Henry M. Stanley? Write a brief story of his work in Africa.
4. Learn something of the work of Cecil Rhodes in South Africa.
5. On an outline map of Africa print names of all political divisions. In the case of a colony indicate name of country controlling it. Indicate those which were former German colonies. Of what value was each of these to Germany?

PART EIGHT. THE WORLD OF TOMORROW

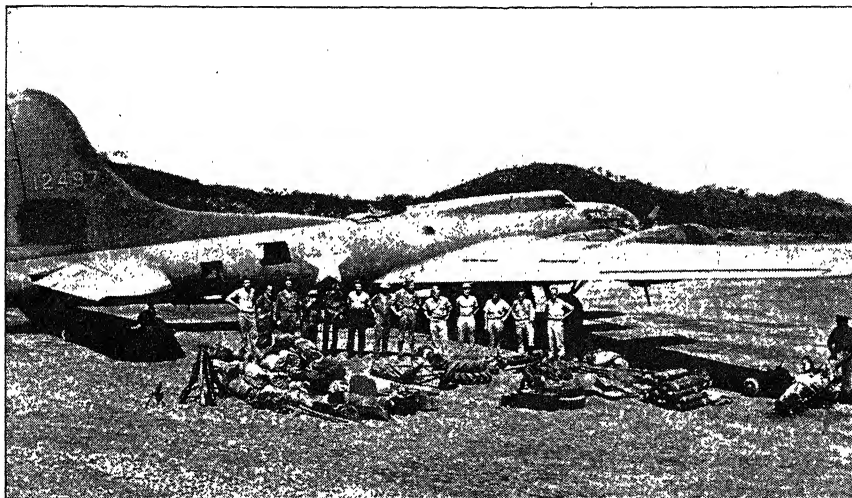


Photo by U. S. Army Air Forces

This is the Boeing B-17 plane, with the men and equipment, which took part in the flight to move artillery to New Guinea by air. The plane's load consisted of one 105-mm. Howitzer complete, 25 rounds of ammunition, one tractor, and the 8-men gun crew with complete field equipment.

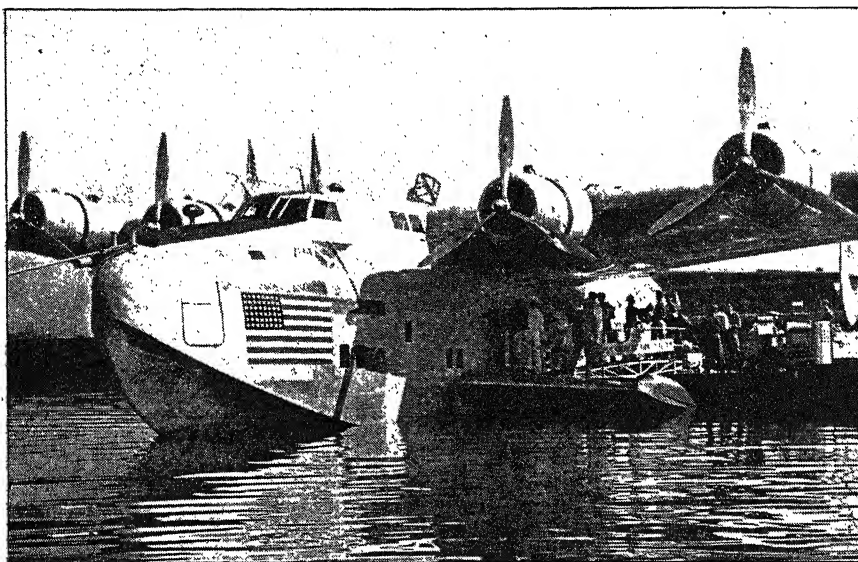
UNIT XX. LIFE IN A NEW WORLD

THE COMING AGE OF FLIGHT

BECOMING AIR-MINDED

The airplane in wartime. Airplanes are playing an increasingly large part in warfare, not only in conflicts confined to the air but in battles on land and on the sea. Land-based planes if in sufficient number are almost sure to turn the tide in a naval encounter. On land the side having superiority, or better still supremacy in the air, is almost sure to be the winner. The best illustration of the effectiveness of air power was shown at Pantelleria where a strongly fortified island was forced to surrender through the use of air power alone.

American planes are carrying troops and supplies all over the world. Over these routes many of the freight carriers are converted air liners of peacetime. They are proving to an almost unbelievable degree what the airplane can do as a freight carrier. By carrying



Courtesy Pan American Airways System

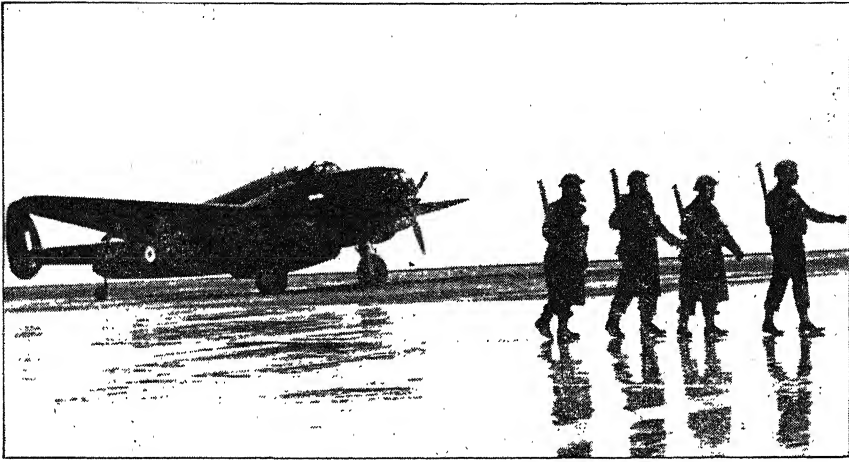
The Atlantic Clipper moored at the marine base at La Guardia Field. Mail and baggage are being loaded on the huge flying ship by the field ground crew.

engines, spare parts, and fuel, freight-carrying planes keep in action pursuit planes and bombers which would otherwise be grounded and useless.

German troops were carried by plane to Norway, to Greece, to Africa, and to Sicily. Huge planes powered by six engines and having six landing wheels attempted to carry soldiers and fuel to Tunisia. Each plane had a carrying capacity of one hundred twenty men or twelve tons of freight. Paratroops dropping from planes did much to overcome the Netherlands, Belgium, and France. Gliders towed by planes transported German soldiers to the island of Crete and thus aided in its capture.

The Air Transport Command. To unify our wartime airplane service the Federal Government has instituted an Air Transport Command. The duties of the Command are to transport executives, military leaders, and war supplies of various kinds wherever government officials may direct. Probably no other wartime agency is doing so much to further postwar aviation not only in our own country but in the world at large.

Recently five big freighters landed in India with ninety tons of war equipment destined for China. They had left the United States less than five days before; in the meantime they had crossed the Atlantic, the Sahara, and the countries of the Near East. These gov-



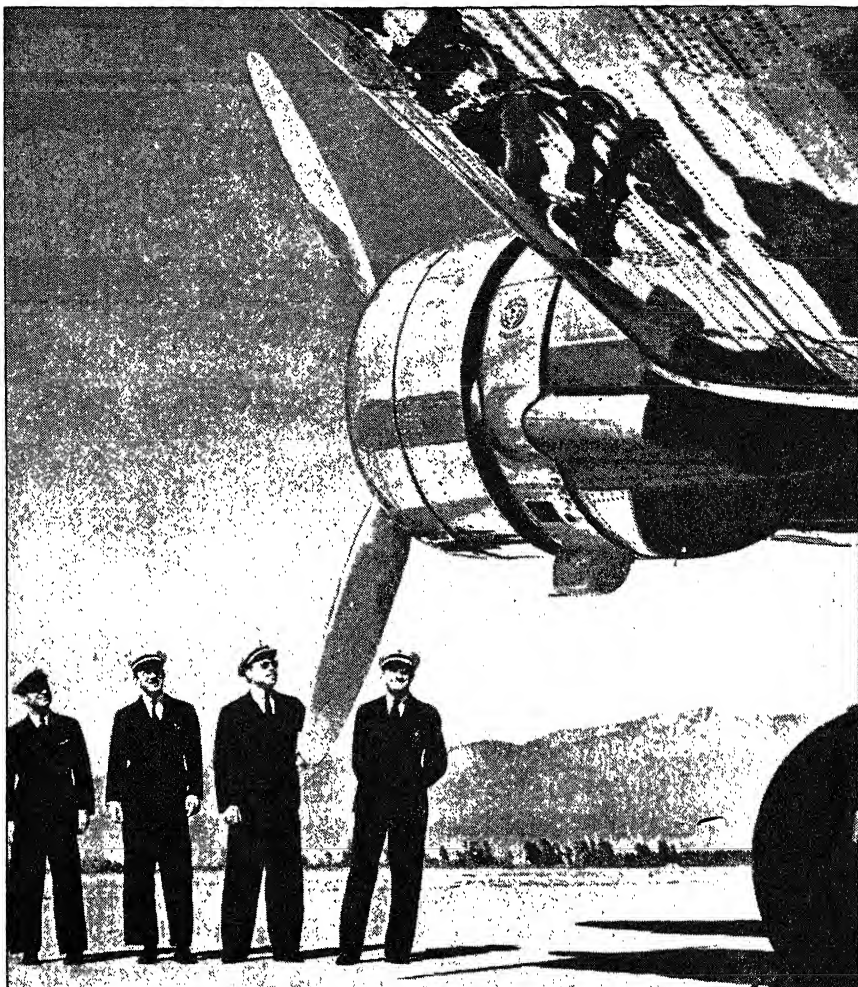
Courtesy Caterpillar Tractor Company

Airport in Newfoundland from which American planes under lend-lease fly to Britain piloted by Royal Air Force Ferry Command. Canadian soldiers stand guard day and night, rain or shine, protecting planes like this Hudson.

ernment planes were operated under the control of the Air Transport Command. It also had charge of the President's trip to Casablanca, of Wendell L. Willkie's trip around the world, and the journey of the President's emissary to Moscow.

Planes controlled by the Command fly to all parts of the world. Great modern airports have been constructed for their use in Canada, Alaska, Greenland, South America, Africa, the Middle East, India, and China. At all stations the Command has its own meteorologists, to forecast weather conditions, and its own repair men. This air-transport service exceeds all others in miles flown and in the number of passengers and the volume of freight carried. It is laying a firm foundation for a world-wide postwar air service. It is almost sure to meet with opposition from other countries after peace is declared. Now that all of its activities are to further prosecution of the war there is no objection, but the great air lines of the world are too valuable a business to be allowed to fall into the hands of one nation without a struggle.

After the war. No one today can tell just how much passenger traffic will be taken over by the airplane of the future. No doubt the saving of time in travel which the plane offers will be a great incentive to travel by air. And, as has been noted, the plane takes the traveler to places not otherwise accessible. As travel by plane



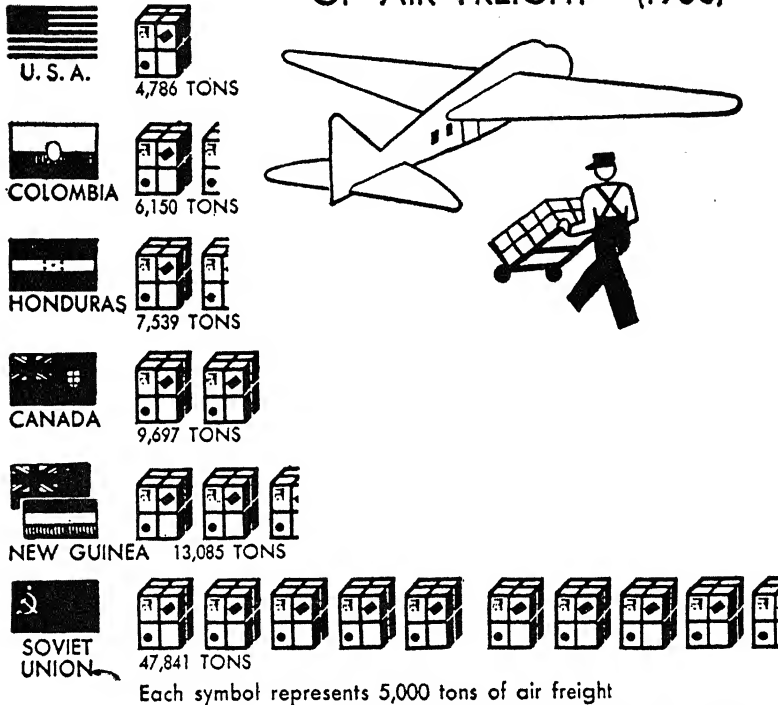
Courtesy Pan American-Grace Airways

Panagra's four-man crew (pilot, copilot, flight radio operator, and purser) at the airport Los Cerrillos, Santiago, Chile. Giant planes like this will represent the United States on the air routes of the future.

continues with the years to become safer and less expensive, the plane will no doubt cut very deeply into the passenger traffic of the railroads and the steamship lines. Even now it is predicted that trans-Atlantic fares by plane will be no higher than first-class fares by ship.

Competition for freight is in some respects similar. Products which are relatively light and valuable can stand the cost of air freight. Heavy and bulky products, such as coal, cotton, and wool which do not call for quick transportation, will for a long time con-

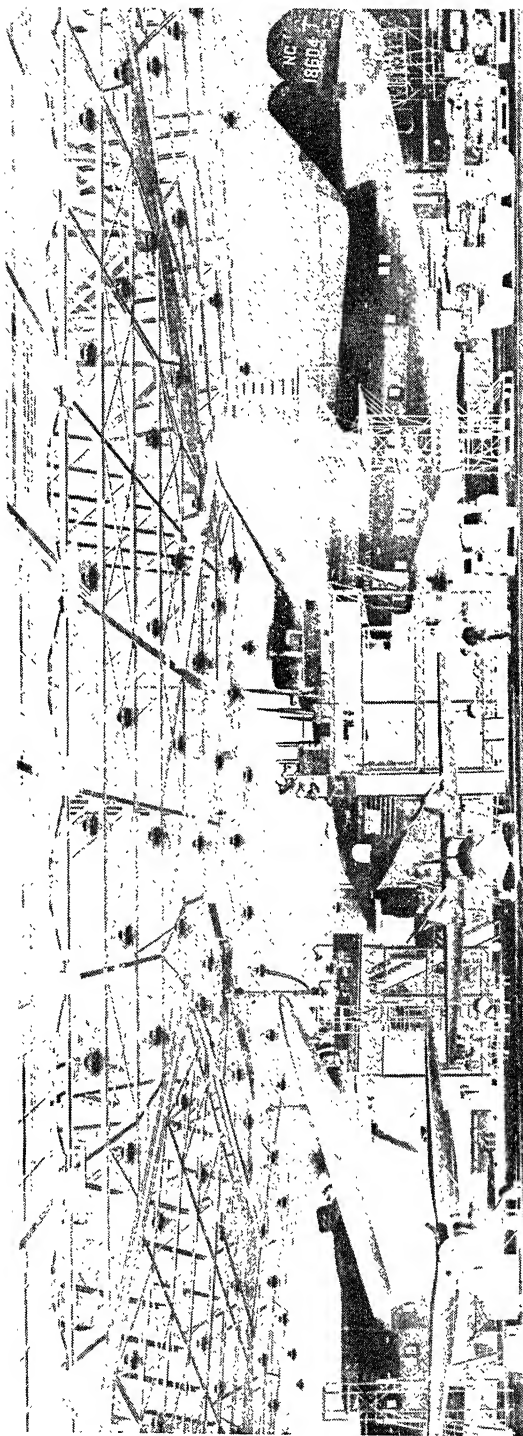
MOUNTAINS, DISTANCES AND POOR TRANSPORTATION ENCOURAGE DEVELOPMENT OF AIR FREIGHT (1938)



Pictograph Corporation for Public Affairs Committee, Inc.

Try to give the reasons in each case why countries, some of which are less progressive than the United States, carry more freight by plane than we do.

tinue to be carried by rail and ship. Furthermore, it has been pointed out that the freight car takes the raw material directly to the warehouse door and likewise takes away the manufactured article without need of trucking. The airplane on the contrary takes its load to and from an airport, some miles away from the factory. This would require expensive trucking which adds to the costs of this method of carrying freight. On the other hand we must not forget that there are many parts of the world—regions characterized by rugged surface, steaming jungles, or Arctic wastes—where goods and people must be carried by plane or not at all. Notwithstanding obvious disadvantages there is no doubt that the freight carrier of the air will hold a large place in the world's transportation program.



Courtesy Pan American Airways System

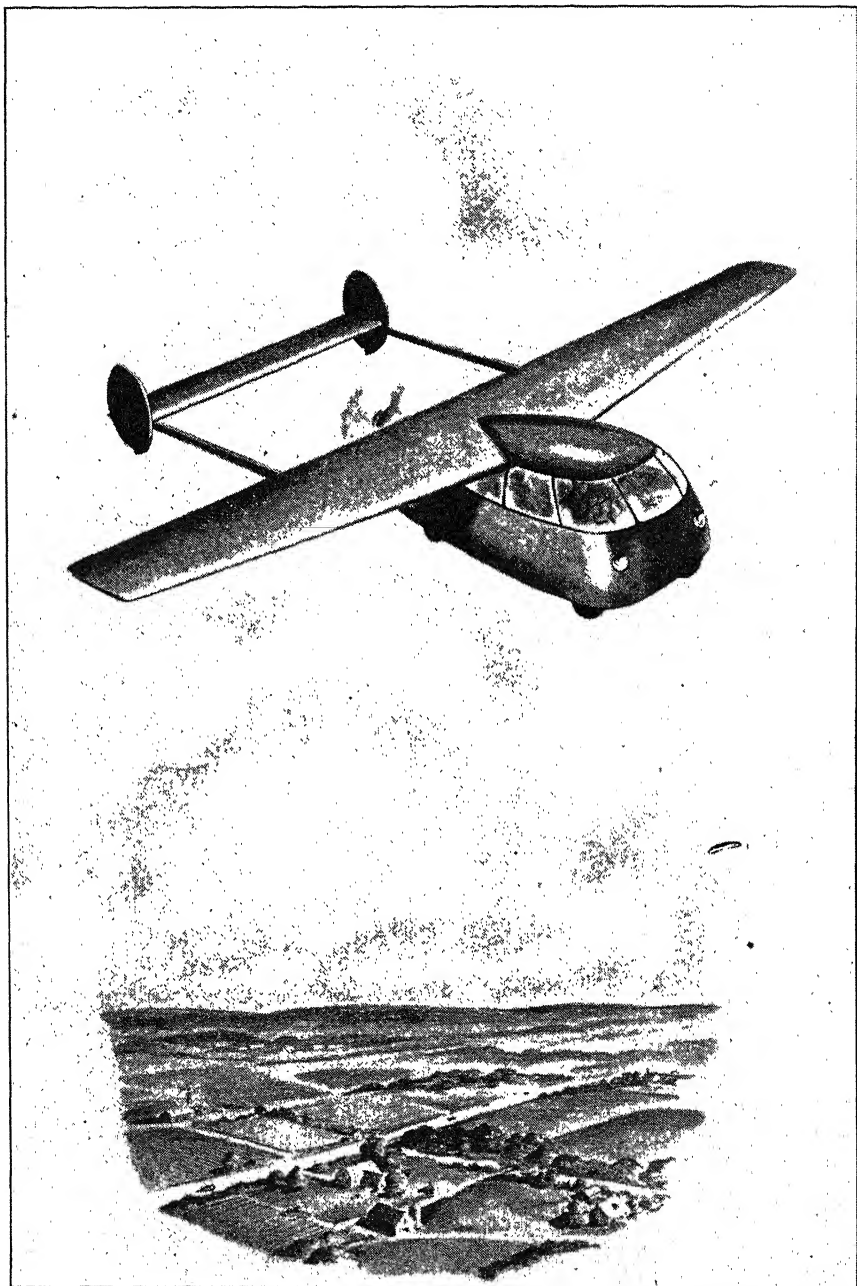
Two of Pan-American Airways 42½-ton transatlantic Clippers are here undergoing the servicing routine which takes 48 hours by a force of 185 men and women. In this night view of the hangar at La Guardia Field, Pan-American Airways works around the clock so that the Clippers may be sent back into service in the shortest possible time.

Routes that pay. The routes followed by planes will not necessarily be the shortest ones. As a plane flies from one large center to another, there may be intervening cities which will provide passengers and freight. Such intermediate points may take the plane far from its straight flight between terminals, but at the same time it may be that only with the aid of the smaller centers would the whole line be profitable. For instance, the shortest route from New York to Chungking, China, is directly over the North Pole, but this flight takes the plane over northern Canada, the Arctic Seas, and Siberia. All these regions have little or nothing to offer in the way of passenger or freight traffic to help pay the expenses of the line. If on the other hand the route between the two terminals should be divided by way of the Azores through North Africa or southern Europe to the Near East, thence to India, and on to Chungking, much business would be acquired along the way, and the line would thus be made profitable. It must also be remembered that long nonstop flights require a heavy load of fuel, thus reducing the pay load of the plane.

On the other hand airplane routes extending over undeveloped and sparsely settled areas from one important airport to another will tend to develop intermedial centers. As we have seen, many sparsely settled regions need only access to the outside world to develop their resources, and thus to lay a foundation for the growth of agricultural and industrial centers.

Air-age thinking. We can be sure that with the coming of peace the whole world will have become air-minded. This will be particularly true of our own country which is building more planes than all the Axis countries put together. Many thousands of our young men from all parts of the country have become expert pilots. They will feel as much at home in the air as on the ground. If it is at all possible, every man will want a plane of his own.

Moreover, our giant airplane plants will be seeking markets for their product. Billions of dollars have been spent in erecting airplane factories and equipping them with costly machinery. An almost unlimited number of skilled employees stand ready to turn out planes as fast as they can be used. It will be for the interest of the country as a whole to keep this labor employed. The great airplane companies of the country by means of full-page advertisements in newspapers and magazines are doing their best to prepare our people for the air age that lies ahead. We are told how quickly we can travel from one part of the country to another or even to foreign countries. Their maps show routes over the Arctic, over the oceans, and over



Courtesy Consolidated Vultee

Here's the flying family car. First sketch released of the Aerocar, double duty automobile and airplane designed by famed W. B. Stout, now head of Stout Research Division of Consolidated Vultee. The flying family car will do 70 miles an hour on the ground, then hook on combined wing and tail assembly and soar over the countryside at 100 miles an hour. The Aerocar now is in the laboratory stage and actual production will await the end of the war.



Courtesy United Aircraft Corporation

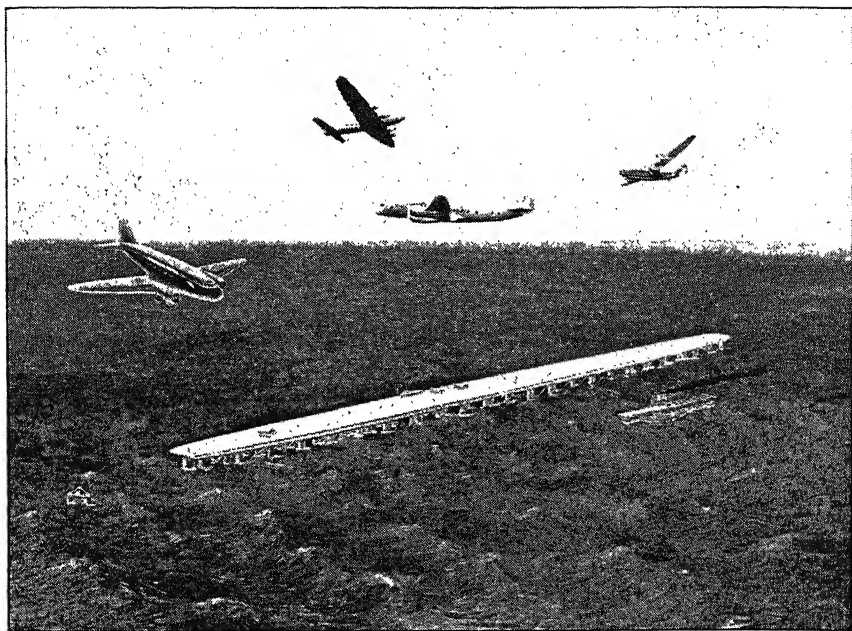
This Sikorsky XR-4 2-place Helicopter developed for the U. S. Army hovers 30 feet above ground while a passenger comes aboard by means of a rope ladder dropped by the pilot.

the countryside. Pictures portray the joy of taking a vacation of a day, a week, or longer and enjoying in a brief time scenes and experiences that would otherwise be impossible. They tell us that the vacationist with only a small amount of money and not many days to spare may visit such places as the battlefields of the present war, or the ancient ruins of Central America, or South America.

Other attractions suggested for the traveler with little time and a small purse are the glaciers of Alaska, the palm-dotted islands of the tropics, and the oases of the Sahara. Places as far away as India and China may be visited within the time of a two weeks' vacation. The plane manufacturers and the air-line companies are doing their best to sell us the airplane travel of tomorrow and there can be little doubt of their success.

To make sure of being first in the field and to stir the imagination of the traveling public, airplane companies are asking for the right to establish new routes and to make use of unusual means of air travel after the war.

The helicopter. Northeast Airlines Inc. has filed application with the Civil Aeronautics Board for helicopter service for the New



Courtesy Edward R. Armstrong

Three seadromes like this, 3550 feet long, between New York and London are proposed by the promoters to be anchored at distances of 900 miles.

England States and the areas near New York City. The helicopter has been likened to a flying egg beater. It has perfect directional control. It can fly straight upward, straight downward, forward, backward, or sidewise, right or left. It can remain stationary in the air. Landing places in the large cities will probably be from roof tops. This service is intended to supplement the service now given by ordinary planes between Boston, New York, and the smaller cities of New England. The Northeast Airlines has also made application for the right to establish a direct air-line service between ports of eastern United States and Britain.

The Greyhound Corporation, a company operating buses over a large part of the United States, has applied to the Civil Aeronautics Board for a license to operate helicopters or similar aircraft over their present bus routes. The President of the Company said, "If our application is approved, we plan to make air travel available to the millions who live scores or even hundreds of miles from the large airports that present air liners must use." This will be a postwar undertaking because of the inability to procure the material for the construction of such planes in wartime.

The seadrome. Even more unusual than the request to supply

helicopter service is the application of the Pennsylvania-Central Air-line Projects for the right to establish and maintain a seadrome route between the United States and Europe. The plan is to place floating airfields at intervals of about nine hundred miles along a trans-Atlantic route. The floating steel island will stand seventy feet above the water and will extend one hundred sixty feet below the surface. Such airdromes would make for greater safety and greatly lessen the load of fuel to be carried. There are to be hotels on the floats so that passengers who wish may wait over till the next plane. The company says, "Today's planes can easily fly this route of tomorrow."

An air-line executive predicts the following postwar schedule between England and the United States. Leave London at 4, 6, 8, and 10 P.M. and at midnight; to these would be added three flights earlier in the day. There will be an equal number of return trips. The flying time between the United States and London is estimated at fifteen hours. It will be possible to carry three hundred passengers per day in luxury liners carrying up to fifty-seven people. The probable cost of passage is set at one hundred dollars. Dependability of service is placed at ninety-seven per cent in winter and ninety-nine per cent in summer. The Atlantic and the Pacific are no longer oceans but millponds.

FREEDOM OF THE AIR

What a study of the pole-centered map shows. The most revolutionary development in the field of aviation is the growth of the idea of the importance of polar routes in the air age. A glance at the polar map will show how the lay of the land on that part of the earth's surface makes such routes not only feasible but practicable. The land masses surrounding the world Mediterranean, or Arctic Ocean, are: Russia (Union of Soviet Socialist Republics); Alaska, a territory of the United States; the Dominion of Canada; Greenland, a dependency of Denmark; Iceland, a republic just below the Arctic Circle; and the continent of Europe including the British Isles. Only Great Britain, Norway with Svalbard, and Russia, and a little of the coast line of Finland of this continent are so situated that airplanes flying directly north toward the pole would not have to fly above some other country's territory. Some planes from Belgium, the Netherlands, and northwestern France might be able to fly over the North Sea directly to the pole.

Of these land masses encircling the Arctic Ocean, Russia extends

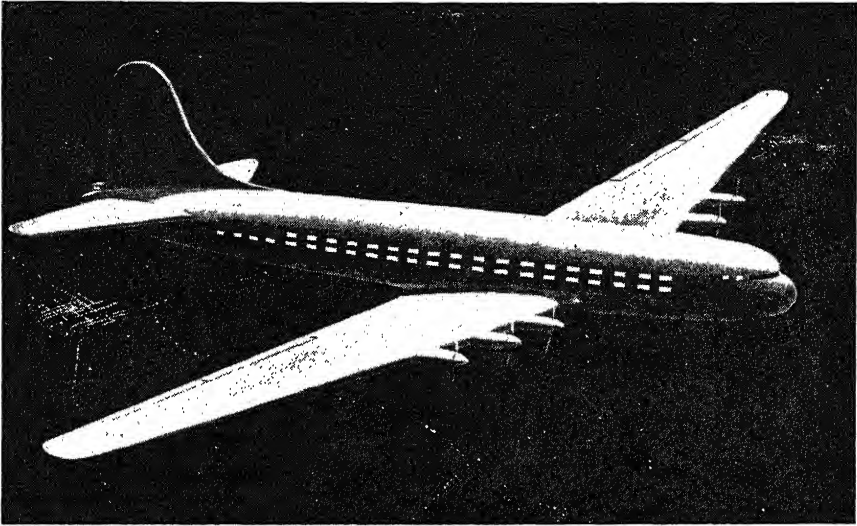


Courtesy Consolidated Vultee and Richard Edes Harrison

This map centered on London which is near the center of the land hemisphere or a north polar-centered map like Plate 1 shows how the land masses of the earth hem in the Arctic seas.

through almost 160° , Alaska about 25° , Canada about 85° (though about 25° of eastern Canada would require a flight over Greenland), Greenland about 50° , and the continent of Europe, about 40° . To go directly north from Iceland a pilot would have to fly over Greenland. The figures show that Russian territory almost half-encircles the pole. This can be readily seen by looking at a polar map, or still better by looking at a globe.

Who owns the air? The situation just described brings up a most interesting and vital question: "Who owns the air?" We have long been familiar with the words: "freedom of the seas." Our war against the Barbary pirates and our War of 1812 were fought over this principle. Except in time of war the freedom of the seas has been recognized by international agreement. In peacetime vessels of any nationality may steam through the English Channel, through the Strait of Gibraltar, or in the coastal waters of any country. Even a warship can pass through the Strait of Gibraltar at the western end of the Mediterranean without question or if stranded on a foreign shore in time of peace no effort would be made to detain her or impound her officers and crew. The case is entirely different as far



Courtesy United Air Lines

Is this the type of giant skyliner that will cruise over the nation's airways and across the seas in the postwar era? United Air Lines does not say.

as airships or airplanes sailing the ocean of air are concerned. It has long been an accepted doctrine that propertyship extends from the surface to the center of the earth and to the sky above. This doctrine was first formally applied to nations by the International Convention of 1919 for Air Navigation. Even before this pronouncement a German military Zeppelin which made a distress landing at Luneville, near Nancy in France, was interned. Early in September, 1942, Wendell L. Willkie started on his breath-taking round the world flight in which he covered 31,000 miles. His first stop was Cairo, Egypt, where he announced himself as "the special representative of President Roosevelt." On September 12 his plane reached Baghdad, in Iraq, where he was lodged in the Royal Palace. Two days later he was in Tehran, the capital of Iran (Persia). On September 17 he arrived at Kuibyshev, Russia. On this leg of the trip it is interesting to know that a Russian pilot was at the controls of the Consolidated-87 Gulliver. From Kuibyshev Mr. Willkie was flown to Moscow, the capital, which for many months had resisted successfully all Nazi assaults. Here he had the opportunity of conferring with Premier Stalin and People's Commissar of Foreign Affairs Molotov. On October 2 Mr. Willkie's plane arrived in Chungking, the new seat of government in China. The Russian temporary capital and the temporary capital of China are 4000 miles apart. The plane in which Mr. Willkie rode was the first plane in

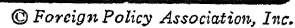


Courtesy Consolidated Vultee

The heavy line shows the route followed by Wendell Willkie in his trip around the world. List as best you can the countries over which his plane flew. Locate the north pole on this map. The old Mediterranean Sea. The new Mediterranean Sea. Where is the center of the map?

history to span Siberia and cut across the Gobi and Mongolia and the first to fly from China to the United States by way of Alaska. This trip around the world from East to West was accomplished in six weeks, during which the traveler made stops of considerable duration. Mr. Willkie arrived in Washington on October 14 to report to the President. The point that needs to be emphasized here is that our State Department had to get freedom of the air from every country over which Mr. Willkie's plane flew. In other words the ocean of the air is not free as we know the free seas.

National sovereignty of the air. This raises an interesting question that must be decided and soon if it is not to result in international entanglements. Rivalries may be engendered that will make competition for favored positions in trade and markets seem insignificant. They can readily lead to war. If freedom of the air could be established by common consent, we would have a condition similar to the freedom of the seas in peacetime. So-called national rights, however, can easily upset such a plan.



The great-circle routes

As we know, the great-circle route is the shortest distance between two places on the earth, but, if the aviator has to abandon his course to circle around some unaccommodating territory, it will be like a railroad having to skirt a large body of water too wide and too deep to be bridged, and the larger the territory the more circuitous

will become the route for the airplane. Such a route would increase the consumption of fuel and take longer time.

Because Turkey objected to having the air above trespassed upon by foreign airplanes, the Dutch and the French had to fly their planes east along the Persian coast and the British along the Arabian coast.

Operating rights in European countries are obtainable only when reciprocal rights are granted; that is, each country grants to the other the same operating rights. Since a small country without airports and airplanes would gain nothing by a reciprocal agreement, it may become hard to deal with. There is no such power to be invoked as the right of eminent domain as when a state wishes to build a highway through a man's property and he objects. The state can condemn the property for the purpose intended and a court fixes a fair price for the property taken.

Now, however, a country, no matter how backward, may force air-line operators in order to secure transit privileges to build an airport and make regular stops even if there is no commercial reason for stopping; they may be forced to employ citizens of the country for various kinds of employment; such a country may exact tolls; or it may in other ways make it difficult for air lines to follow the routes that would save them time and money and promote the general interest.

However, there is a brighter side to the picture that may result in a more reasonable attitude on the part of recalcitrant nations. Science and invention may thwart those who would follow such a narrow-minded policy. A well-fueled stratosphere plane that can climb to 45,000 feet can pass over territory unseen and only would its presence be known if it were compelled to make an emergency landing. Under such a circumstance no heavy penalty could be exacted without arousing the indignation of an air-minded public. Rather than being ignored by an important air line, most countries would probably offer landing routes and other inducements as in the days of railroad building many cities paid bonuses to have the tracks laid to their environs.

GUIDES TO STUDY

1. How has the airplane proved its value in time of war?
2. What have been the accomplishments of the Air Transport Command?
3. How may the plane of the future compete with railroad and ship?
4. Show that continuous or non-stop flights between distant points may not be profitable.

5. What conditions are tending to make the people of our country air-minded?
6. What does the helicopter promise for the future?
7. Is the seadrome only a dream?
8. Where are we likely to spend our week ends and our vacations after the war? Why?
9. Shall we be allowed to fly over the land of other nations?
10. What events of the past suggest that planes of one country may not be permitted to fly at will through the air over another nation?
11. How may this difficulty be overcome?
12. The ownership of the air is sure to receive much attention in the months and years to come. Study papers and magazines to learn what our leaders are thinking and how the problem is likely to be solved.

TOPICS FOR CLASS DISCUSSION

1. The airplane of the future.
2. Helicopters *versus* autogiros.
3. Freedom of the air.
4. Mass production of airplanes after the war.
5. Competition of air transportation.

WORK TO BE DONE

1. Let the class select one or more topics in this section which they would like to study and discuss in greater detail.
2. Listen to radio discussions on some of these questions and report to class.
3. Try to show that the airplane can contribute as much to peace as it has contributed to war.
4. Make an aviation scrapbook by clipping worth-while articles and stories from newspapers.

2. AMERICA LOOKS AHEAD

OUR COUNTRY'S DOMESTIC AND INTERNATIONAL PROBLEMS

From war to peace. As this book is written, the world is still far from peace. But, as patriotic and loyal Americans, we look forward with confidence to the day of victory, when we shall have a part in deciding what the world of the future is to be like. We can be sure of one thing: that there will be many problems for the world to solve when the war is over. At the present time we cannot even be certain just what these problems will be; and we certainly cannot make any definite plans for their solution. But we can and should begin to think of the possible problems of the postwar world; for only by such forethought can we prepare ourselves for the questions which we, as young citizens, will be asked to answer.

DOMESTIC PROBLEMS

^oBack to work. When peace comes, we shall have to relocate in civilian life probably ten million men and women. The exact figures we cannot tell at this time. We do not yet know how large our armed forces will eventually become; nor how great our losses are to be in killed and permanently disabled. But let us assume that we have ten million able-bodied men and women to replace in peacetime pursuits. The first great problem we shall face is that of civilian employment for this vast army of discharged soldiers, sailors, marines, and women auxiliaries. The great majority of these ex-service people will be between twenty and thirty-five years of age, in the prime of productive life. In order to be self-supporting and to establish families, on which our future population will depend, they must have immediate employment after they leave the armed services. No kind of government relief or bonus pay will satisfy these people or make them self-reliant. How they are all to be gainfully employed will be one of our greatest postwar problems. Many ideas are being advocated for the solution of this problem. The first is the idea of conversion of our war industries to the production of peacetime necessities. It seems sensible to say that there will be a great postwar demand for such things as automobiles, commercial airplanes, refrigerators, radios, household goods, clothing, dwelling houses, all sorts of personal equipment, and the innumerable machines needed to produce these goods. This conversion of war industries to a peacetime basis will employ millions of workers. The problem is whether or not this conversion will absorb all the new workers thrown into the labor market by the demobilization of our armed forces. One fact that will complicate this problem is the vast number of women now employed in industry. It is probable that large numbers of these women will be glad to go back to their former places, either as workers in the customary fields of female employment or as housewives. Some employers, however, are on record as saying that women are in industry to stay.

Public works. If it turns out that a large number of our returning service men cannot find immediate employment in private industry, it will probably be necessary for our government to inaugurate some system of public-works projects to take up the slack in unemployment. Most people hope that this will not be necessary, since most men would far rather be employed in a really productive job than in a publicly supported relief activity. However, our govern-

ment is said to have plans in readiness to take care of this problem if it should arise.

Paying the bills. There is also a financial side to this postwar conversion to peacetime production. Assuming that our war plants are converted to the production of civilian goods, will our people have money enough to buy these things when they are produced? It is hoped that the billions of dollars invested by our citizens in war bonds and other savings will give them enough purchasing power to keep the wheels of industry turning in this critical postwar period. Whether that will be true, only time can tell. Of course, if mills, factories, and farms are kept busy supplying our needs after the war, the earnings of the men thus employed will give the purchasing power needed to keep production going.

Another home problem after the war will be that of taxation. War is an expensive business, as we all know, and our present high rates of taxes must continue for many years in order to pay off the great debts our government has contracted to carry on the war.

From bullets to ballots. There will also be many political problems after the war. On account of the need for quick decisions and rapid action, our government has had to give a great deal of power to the President and to the various bureaus or executive boards under his control. This results in what we call *centralized government*, as opposed to local or state control of our civilian activities. If such centralized government is carried too far, we call it *dictatorship*. There is very little danger of dictatorship in our country for two reasons. In the first place, we elect our own Congress, which has the power to make or repeal all laws and policies of government. In the second place, we elect our own President, whose duty it is to put these laws and policies into effect.

But after the war our people and our elected representatives will have many problems to decide. Let us examine a few of these problems briefly.

Government ownership. Perhaps the first question to be met will be this: how much control shall government exercise over business and industry? At present, through different agencies, our government actually owns more than 1500 war plants, with a federal investment of more than \$10,000,000,000. These plants are operated under private management, but under strict government control. When they are converted to peacetime production, after the war, shall they remain under government control or shall they be refinanced by private investment? Certain influential political and busi-

ness leaders think that the government should continue to finance our great industries, and that this should become the established American policy. Their principal argument is that there will not be enough private financial backing to take over these government-owned corporations; and that the postwar limitation of business will not produce enough profits to make such private investment worth while. They say that the government should continue to invest public funds in business and industry in order to keep the population employed. They also say that under government control the absence of large profits would keep all commodity prices at lower levels, thus making the cost of living lower for all.

The opponents of this policy believe that government control means political waste and inefficiency. They say that only private ownership can supply the energy and good management necessary to make production effective and business successful. They say, further, that federal control of all business and industry would mean increased costs to the entire people, which can be met only by higher and higher taxation. State control, they say, would lower the wage scales of workers and thus reduce the standard of living for the entire population. It would be a form of State Socialism, which is one of the things we are now fighting against.

Perhaps the solution of this problem may be a temporary continuance of federal financing of industry, with a gradual return to the system of private ownership and competitive business. This may be possible. Whatever may be the answer to this industrial dilemma, all authorities agree that great trusts or monopolies must not be allowed to restrict competition and control prices and wages. The control of these great corporations will be another postwar political problem.

Prices and wages. The second great postwar political problem will concern the regulation of prices and wages. Price control will depend to some degree upon the production of food and manufactured goods and upon the conditions of domestic and foreign trade. What these conditions will be we cannot foresee now, but they will determine the political action we shall have to take in order to stabilize our national standards of prices and wages. Closely connected with these factors is the matter of social security for our people. Old-age pensions and unemployment compensation, together with the rehabilitation and care of ex-service men and women will all be political problems.

In the field of education there will be the question of how far the

Federal Government shall go in the financing and control of local school systems. So in many of our everyday affairs there will arise questions which can be decided only by the political decisions of our elected representatives. Perhaps by far the greatest political problem of the postwar period will be the selection of representatives to govern us who will be devoted to really democratic ideals and who will keep us clear of the dangers of political dictatorship.

INTERNATIONAL PROBLEMS

The four freedoms. The first international problem we shall face after the war will be that of our relations with the other United Nations. These nations have already endorsed the "four freedoms": freedom of speech; freedom of religion; freedom from want; and freedom from fear.

There will be many questions to be decided in connection with each of these freedoms. What shall be done about tariffs on trade between different countries? What shall be done about guaranteeing freedom of religion in all countries? How far shall free criticism of the government be allowed to go? How shall our people be protected against the fear of future aggression by their more powerful neighbors? The tariff question is a very complicated one, and we can only touch upon it briefly here. Some countries are chiefly agricultural, or pastoral; some are rich in minerals and other natural resources; some are largely industrial. Trade must be so arranged that none of these countries will be handicapped by tariff barriers. These barriers have caused a great deal of trouble in the past, and this must not be allowed to happen again. Many countries will try to develop new manufacturing industries in order to use their own raw materials. This will change the conditions of world trade considerably; and as a great producer of both raw materials and manufactured goods we must be ready to meet new world competition. Freedom of worship, or the right of all people to their own religious beliefs, is generally admitted today to be an essential part of the ideal of democracy. Wherever this right has been denied, it should be freely granted in the world of the future.

Freedom of speech and communication is essential to democratic government, and there is little doubt that the postwar world will recognize this fact. However, it is possible that some restraint will have to be placed upon the degree of subversive criticism to be allowed even in free countries. The most serious problem for many

nations after the war will be the fear of future invasion and conquest by other nations. This matter will be treated more fully at the end of this chapter.

The future of the Axis. What shall be our policy with regard to the Axis powers against whose aggression we are now fighting? Shall they be completely disarmed? If so, how is this to be done? Shall they be required to repay, either in money or in goods, for the enormous damage they have done to the world? How can this be accomplished? Shall they be allowed to resume their places as world powers? If so, what guarantees shall be demanded that they will not again attack the rest of the world? Shall they be compelled to adopt a democratic form of government? If so, how can this change be effected?

All of the above questions involve also the so-called "captive peoples." It will be difficult to reestablish such countries as Austria, Hungary, Rumania, Czechoslovakia, Poland, Yugoslavia, France, Belgium, Norway, Denmark, Holland, and Greece. Many experts think that some of these countries should be joined in some sort of federation to give them more political, economic, and military strength. How these groupings are to be made will be a serious problem.

Can Europe unite? While such international problems concern all parts of the world, they are particularly serious in Europe. Here, then, are densely populated countries in many of which starvation and ruin is the rule at present. Even though we are not responsible for these conditions, it will be both human and expedient for us to provide these countries with food, supplies, and financial aid. Americans have always been ready to assist any people in distress, and we shall undoubtedly do so again. But it will also be to our advantage to assist the downtrodden peoples of Europe. For Europe has always been our greatest market for all kinds of goods. If Europe is bankrupt and ruined, that market is lost. But if Europe can be reestablished in peace and prosperity, then we shall again benefit by trade with European countries.

The great question of the future will be how to insure peace and prosperity not only to Europe but to the rest of the world as well. Many plans to do this have been suggested, and from them we may select certain ideas that seem feasible.

Why it should unite. The first generally accepted thought is that there have been too many small, poor, and weak national units in Europe. Such countries as Austria, Czechoslovakia, Rumania, Hungary, Greece, and Yugoslavia had conflicting commercial and

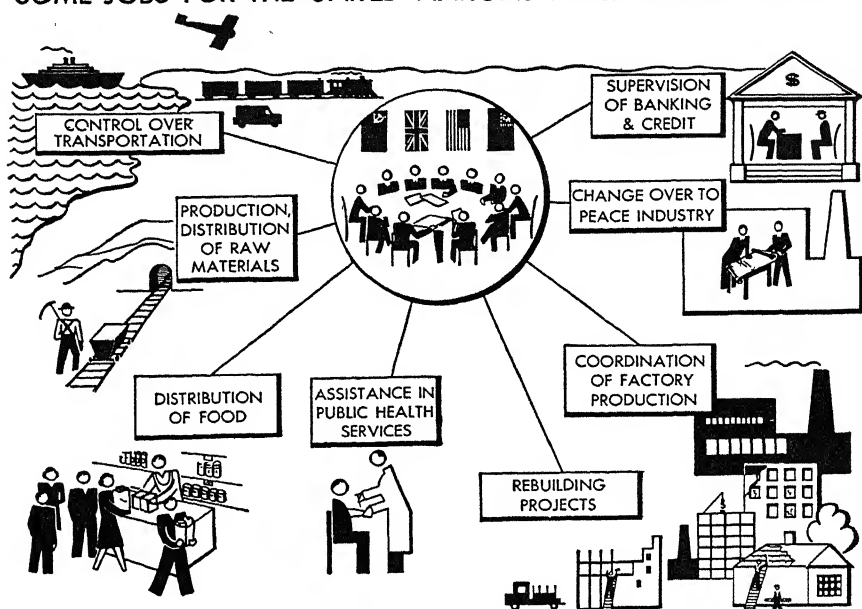
political interests. They were, therefore, easy prey to an aggressor like Germany. Now the feeling is that these small nations should get together, pool their resources, abandon their racial jealousies, and unite in some form of federation for the general good of all. Such a movement will require careful planning and much assistance from the great world powers.

There will be many difficulties in carrying out any unification of Europe. Financial aid will be necessary at first. Then the people of all these countries must be educated to the need of a new type of commercial and political life. Finally, the form of the European federation must be carefully worked out so that all national groups will be treated justly and given guarantees of real freedom.

No more tyranny. The security of Europe will depend upon its safety from aggression by Germany or any other great power. In the case of Germany, it is generally felt that this great nation should be kept under rigid control until such time as its people agree to coöperate with the rest of the world, instead of attempting to become an all-conquering race. This change in the German mind may take a long time to accomplish, but there can be no permanent European peace until it is effected. The entire German educational system will have to be revised so as to teach democracy to its youth instead of militarism. Only in this way can Europe be spared the horrors of repeated wars.

Shall we help? There is at present great disagreement on the question of what part our country should take in this unification and pacification of Europe. Many thoughtful leaders say that we should assist in forming an international police force, whose duty it would be to prevent the outbreak of warfare in any part of the world. This police force would be made up of contingents from all the peacefully inclined nations of the world and would be under the control of some sort of international peace commission. Eventually it is hoped that every nation in the world will support this kind of collective security against war. Unless such an arrangement does have the active support of all peaceful powers, it cannot succeed. However, there are many who think that no international police force will ever be successful. They say that sooner or later some power or group of powers will break away from the peace agreement and again plunge the world into war. There is also the danger that one or more of the greater powers might attempt to use an international police force to strengthen its own hold upon territorial possessions, and to block any movement on the part of such possessions to become independ-

SOME JOBS FOR THE UNITED NATIONS RELIEF ORGANIZATION



Pictograph Corporation for Public Affairs Committee, Inc.

This diagram shows some of the troublesome problems the United Nations will have to solve after the war.

ent national units. It is apparent that any such action would be directly opposed to the fundamental ideas expressed in the United Nations' now famous "four freedoms."

Finally, there are those who say that the United States should keep completely out of any such international movement. They feel that we would do better to remain free from all such agreements; that we should keep ourselves strong enough to be forever safe from aggression by any other power, and allow Europe to settle its own difficulties in its own way.

Prosperity and peace. We may be certain of one thing: that there will be great changes in the conditions within various countries and in their relations with one another. These changes will be not only political, but social and economic as well. Economic experts are already studying methods of securing more effective distribution of the resources of productive regions and more equitable trade relations among the world's peoples. Closely connected with these economic plans are the problems of improving social conditions in countries where low standards of living now exist. There is a close relation between these social and economic conditions and the politi-

cal status of the countries involved in the reconstruction of world affairs. When the people of a country are prosperous and contented there is less political unrest. Whether or not all countries in the postwar world will turn to democratic forms of government is uncertain. But, whatever their political arrangements may be, if they have peace and prosperity, they will also have political stability and security. To bring these results about will be the most difficult and at the same time the most important problem of the postwar world. As one of the world's great powers, the United States will probably find it necessary to take an active part in planning and making effective this world reconstruction. In the modern world, no one country can stand aloof from all others; and all must plan and work together for the good of humanity as a whole.

GUIDES TO STUDY

1. Why will the end of the war leave us many problems to solve?
2. Why will the question of unemployment arise?
3. How may public works help solve the problem of unemployment?
4. Will people have money to buy the goods which our great factories will be able to produce after this war?
5. How do high taxes affect purchasing power?
6. What are the advantages and the disadvantages of government control of industries?
7. What is meant by social security and how can it be attained? What is our government now doing in the way of old-age and unemployment insurance?
8. What problems do the Axis Powers present to us after the war?
9. What are our responsibilities toward other peoples who are striving for self-government?
10. How can we help prevent tyranny by self-seeking nations in the future?
11. What rewards can world-wide peace bring to all peoples?
12. What can each one of us do to bring about peace among all peoples?

TOPICS FOR CLASS DISCUSSION

1. Jobs for service men and women after the war is won.
2. Wisdom of cashing war bonds to buy automobiles or airplanes.
3. How to prevent Germany and Japan from future aggression.
4. Our part in making a better world.

WORK TO BE DONE

1. Let the class select one or more topics in this section which they would like to study and discuss in greater detail.
2. Listen to radio discussions on some of these questions and report to the class.

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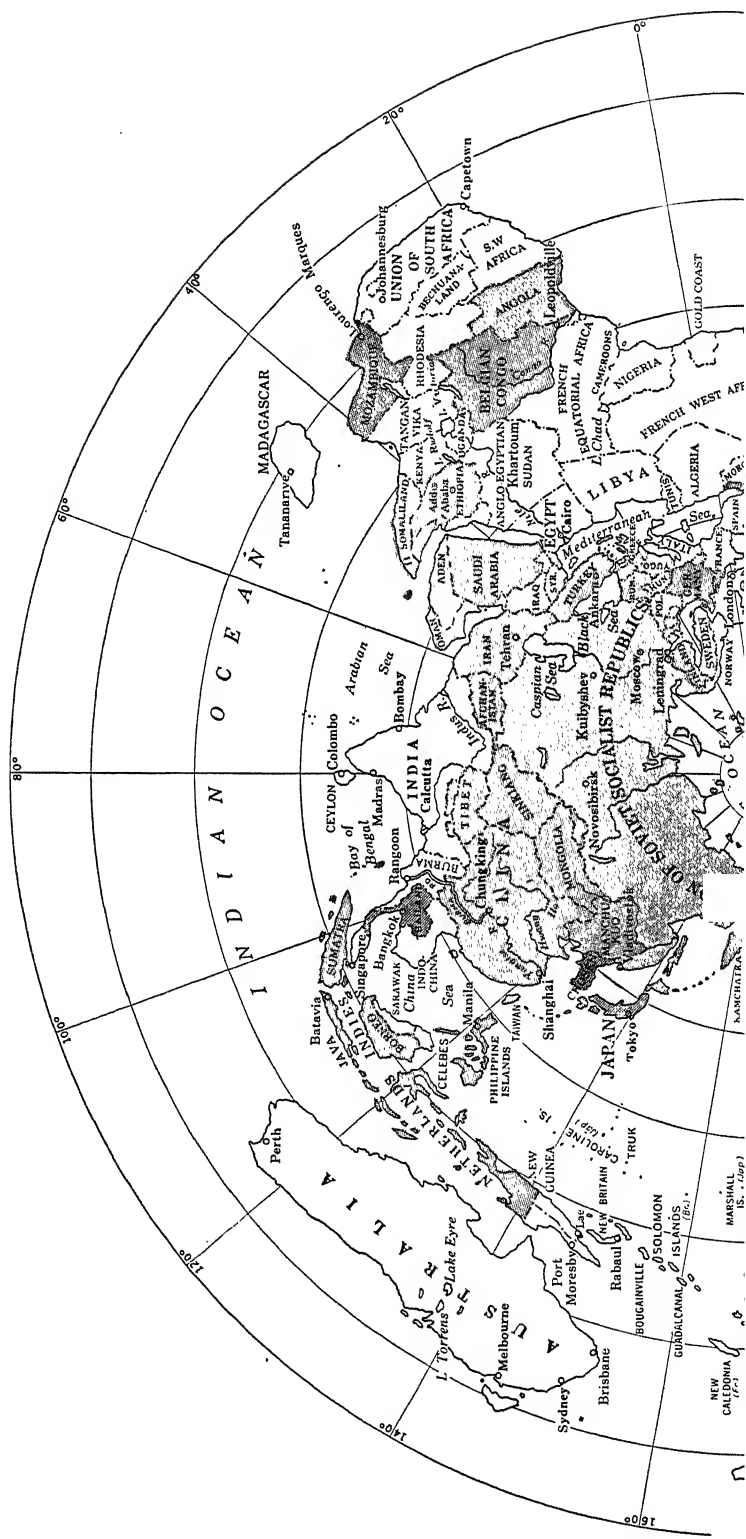
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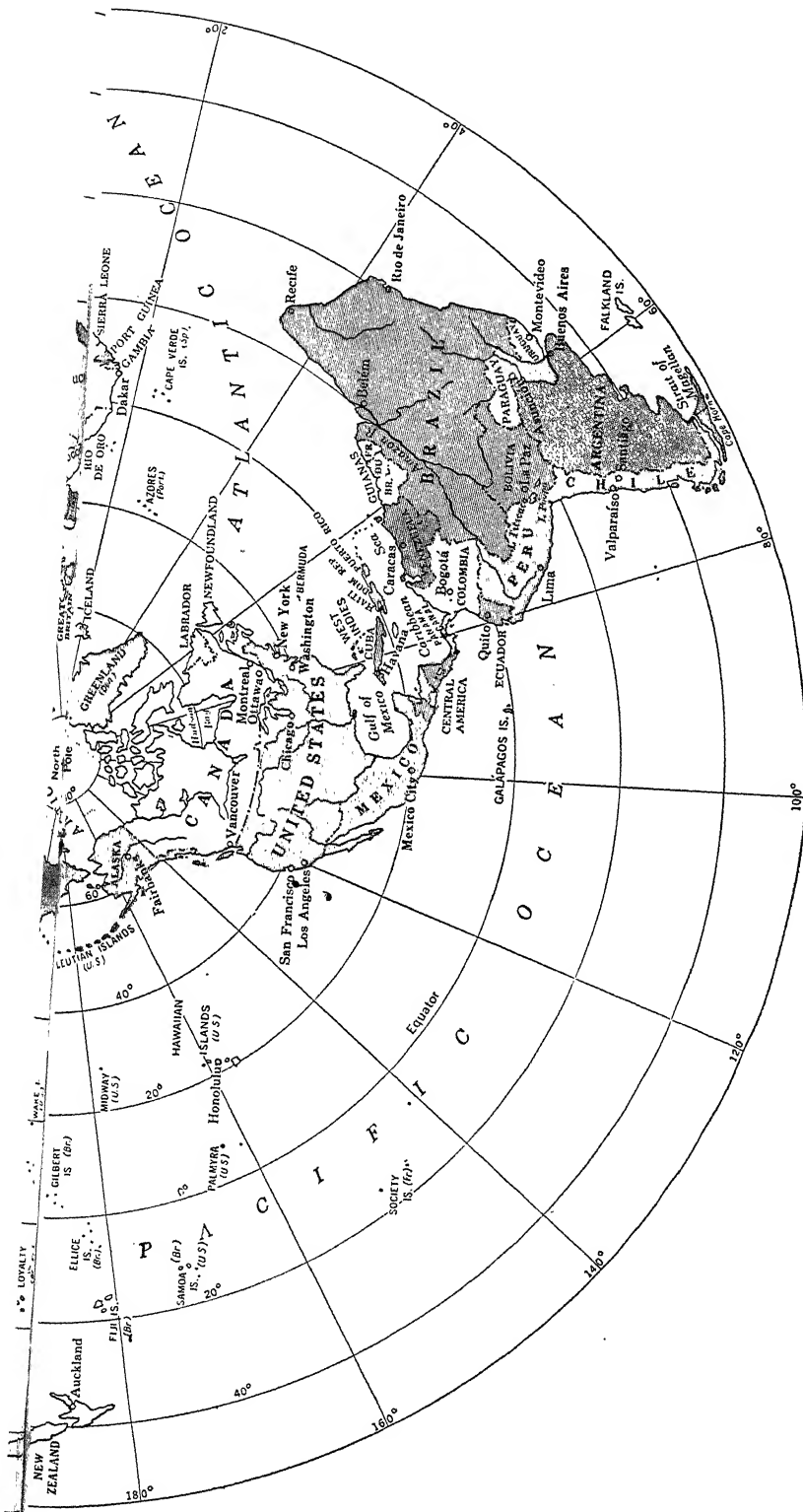


PLATE 1.—POLAR-PROJECTION MAP OF THE WORLD

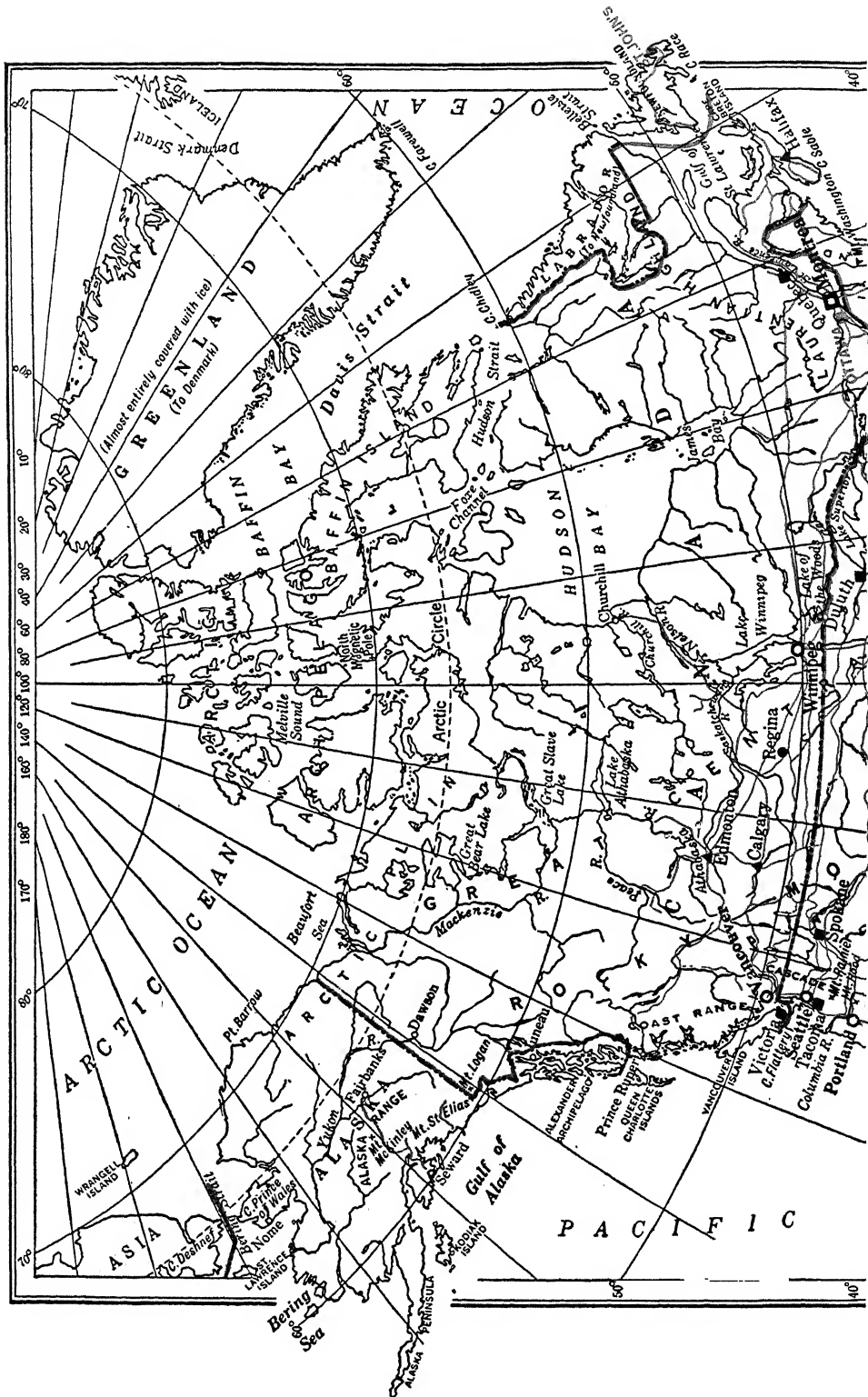
Table 1

CONTINENT, COUNTRY, STATE, ETC.	AREA IN SQ. M.	POPULATION	POPULATION OF PRINCIPAL CITIES (U. S. IN 1940)		
			Capital	Other Cities	
North America:					
Alaska	*9,355,000	73,000	Juneau	Ketchikan	Anchorage
Bermuda Islands	586,400	32,000	Hamilton	St. Georges	Toronto
Canada	9,984,720	11,783,000	Ottawa	Ottawa	Montreal
Alberta	3,084,700	11,783,000	Edmonton	Calgary	Lethbridge
British Columbia	355,000	809,000	Victoria	Vancouver	New Westminster
Manitoba	251,800	722,000	Winnipeg	Brandon	St. Boniface
New Brunswick	29,000	453,000	Fredricton	Fredericton	Moncton
Ontario	25,000	573,000	Halifax	Saint John	Moncton
Quebec	412,000	3,150,000	Quebec	Quebec	Gloucester
Prince Edward Island	2,200	100,000	Charlottetown	Summerside	Ottawa
Saskatchewan	594,400	332,000	Regina	Regina	Yorkton
Northwest Territory	2,217,700	888,000	Regina	Regina	Verdun
Yukon	1,207,700	11,000	White Horse	Sackatoon	Moose Jaw
Central America:					
British Honduras	215,000	8,919,000	Dawson	White Horse	
Costa Rica	8,600	17,000	Belize	Limón	Heredia
Guatemala	23,000	63,000	San José	Cobán	Quezaltenango
Honduras	43,400	3,284,000	Guatemala	San José	La Esperanza
Nicaragua	49,500	1,380,000	Managua	Managua	León
Panama	32,400	636,000	Panama	Colón	David
Panama Canal Zone	550	52,000	Balboa Heights	Balboa	Port Davis
El Salvador	13,200	1,745,000	San Salvador	San Ana	San Miguel
Guatemala	78,000	18,000	Sidproven	Guatemala	Monteury
Mexico	769,300	19,470,000	St. John's	Coast Bunk	Veracruz
Newfoundland	42,700	300,000	St. John's	Battle Harbor	Hopedale
Labrador	120,000	5,000	Washington		(under 5,000)
United States	3,020,800	131,669,000	Washington	Birmingham	
Arizona	112,000	2,833,000	Montgomery	Tucson	Mobile
Arkansas	152,000	1,849,000	Little Rock	Fort Smith	Douglas
California	153,300	6,907,000	Sacramento	Los Angeles	San Diego
Colorado	108,300	1,123,000	Denver	Pueblo	San Francisco
Connecticut	5,000	1,709,000	Hartford	New Haven	Colorado Springs
Delaware	2,400	266,000	Dover	Wilmington	Bridgeport
District of Columbia	58,700	1,897,000	Washington	Washington	
Florida	59,300	3,123,000	Tallahassee	Jacksonville	Miami
Georgia	59,300	2,825,000	Atlanta	Pocahontas	Augusta
Idaho	83,500	78,907,000	Boise	Chicago	Idaho Falls
Illinois	56,700	7,897,000	Springfield	Peoria	South Bend
Iowa	56,100	2,538,000	Indianapolis	Fort Wayne	101,000
Kansas	82,200	1,800,000	Topeka	Kansas City	66,000
Kentucky	40,600	2,846,000	Frankfort	Louisville	122,000
Louisiana	48,500	2,364,000	Baton Rouge	New Orleans	Covington
Maine	33,000	1,847,000	Augusta	Portland	Shreveport
Massachusetts	8,500	1,437,000	Springfield	Baltimore	Lewiston
Michigan	59,000	5,256,000	Lansing	Detroit	Cumbeiland
Minnesota	84,700	2,792,000	St. Paul	Minneapolis	Springfield
Mississippi	46,000	2,184,000	Jackson	Meridian	140,000
Missouri	69,400	3,785,000	Jefferson City	St. Louis	Springfield
					101,000
					24,000
					35,000
					396,000

Table 2

CONTINENT, COUNTRY, STATE, ETC.	PRINCIPAL PRODUCTS			PRINCIPAL EXPORTS	PRINCIPAL IMPORTS
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
North America:					
Alaska	Reindeer, fish	Canned fish	Gold, copper, silver	Fish, minerals, fur	Foodstuffs, I-S, machinery
Bermuda	Vegetables, lily bulbs	Paper & pulp, foodstuffs, I-S	Coal, gold, copper, nickel	Vegetables, lily bulbs	Foodstuffs, textiles
Canada	Wheat, oats, hay	Flour	Coal, nat. gas, petroleum	Wheat, foodstuffs, paper	Textiles, I-S, coal
Alberta	Wheat, mixed farm products	Lumber products	Copper, lead, coal, zinc		
Br. Columbia	Wheat, mixed farm products	Lumber, foodstuffs	Building stone, gypsum		
N. Brunswick	Dairy products, vegetables, fruit	Paper & pulp	Coal, iron ore		
N. Nova Scotia	Apples, oats, dairy products, fish	I-S, paper & pulp	Gold, nickel, silver		
Ontario	Dairy products, wheat, furs	Autos, flour, paper & pulp			
Pr. Edw. Isl.	Potatoes, dairy products, furs, fish	Foodstuffs	Asbestos		
Quebec	Dairy products, potatoes, furs, oats	Paper & pulp, textiles, foodstuffs	Coal		
Quebec (Eastern)	Wheat, oats, dairy products	Flour			
N. W. Terr.	Furs		Silver, gold		
Yukon	Corn, chief food crop				
Central America	Mahogany, bananas	Shoes, soap, candles	Gold, silver	Bananas, mahogany	Foodstuffs, textiles, I-S
British Honduras	Bananas, coffee, cacao	Tobacco products, hats	Gold, mica	Coffee, bananas, cacao	Textiles, I-S, foodstuffs
Costa Rica	Gold, bananas, lumber		Silver	Coffee, bananas, mahogany	Textiles, foodstuffs, I-S
Guatemala	Coffee, sugar			Coffee, bananas, mahogany	Textiles, foodstuffs, I-S
Honduras	Coffee, sugar, lumber			Coffee, bananas, mahogany	Textiles, foodstuffs, I-S
Nicaragua	Bananas, cacao, coconuts			Bananas, cacao, coconuts	Foodstuffs, textiles, I-S
Panama C. Z.	Coffee, sugar, henequen	Textiles, shoes		Coffee, sugar	Foodstuffs, textiles, I-S
El Salvador	Furs, animal oils	Textiles, tobacco products	Petroleum, silver, lead	Furs, animal oils	Foodstuffs
Greenland	Corn, vegetables, coffee, cotton	Textiles, tobacco products	Petroleum, silver, lead	Petroleum, metals, coffee, sisal	Textiles, foodstuffs, chemicals, I-S
Norway	Corn, vegetables, coffee, cotton	Pulp	Iron ore	Fish, iron ore, paper & pulp	Foodstuffs, textiles, coal, I-S
Sweden	Fish, lumber				
Labrador	Livestock, corn, cotton	I-S, textiles, foodstuffs	Coal, petroleum, iron	{ Cotton, machinery, autos,	{ Raw silk, coffee, rubber, sugar,
United States	Cotton, corn, livestock	I-S, textiles, foodstuffs	Iron, coal, clay, stone	{ petroleum products, food-	{ paper, hides & skins, copper
Alabama	Livestock, cotton	Smaller products (copper, etc.)	Copper, gold, silver		
Arizona	Livestock, cotton, corn	Lumber, cottonseed products	Petroleum, coal, bauxite		
California	Fruit, grapes, raisins, cattle	Petroleum, meat, foodstuffs	Petroleum, gold, silver		
Colorado	Livestock, sugar beets, wheat	Refrigerators, foodstuffs	Gold, silver, zinc		
Connecticut	Livestock, dairy products	Textiles, hardware, brass	Clay, stone		
Delaware	Truck garden products	Explosives, leather, can goods			
D. C.		Lumber, naval st., tobacco prod.	Phosphate rock, stone		
Florida	Fruits, vegetables	Textiles, lumber, naval stores	Stone, clay		
Idaho	Corn, fruit, livestock	Lumber, dairy prod., grain prod.	Sand, silver, zinc		
Illinois	Corn, cattle, hogs	Lumber, autos, I-S	Coal, petroleum, stone		
Indiana	Corn, cattle, hogs	I-S, auto access., meat products	Coal, petroleum, stone		
Iowa	Corn, cattle, hogs	Meat, dairy, other food products	Coal, gypsum, sand		
Kansas	Wheat, cattle, corn	Food & petroleum prod., cement	Petroleum, zinc, coal		
Kentucky	Tobacco, corn, livestock	I-S, tobacco products	Coal, petroleum		
Louisiana	Potatoes, rice, garden truck	Petroleum & lumber prod., sugar	Petroleum, sulphur, salt		
Maine	Garden truck, fruit	Textiles, foodstuffs, textiles	Refrigerators, granite		
Maryland	Garden truck, fruit	Clothing, food products	Refrigerators, granite		
Massachusetts	Dairy products, garden truck, fish	Textiles, shoes, hardware	Stone and clay products		
Michigan	Dairy products, potatoes, corn	Autos, other I-S, furniture	Iron ore, copper, cement		
Minnesota	Dairy products, grain	Flour, other food products	Iron ore		
Mississippi	Cotton, corn, garden truck	Lumber, cottonseed products	Lead, clay, gravel		
Missouri	Corn, cattle, hogs	Meat products, shoes, I-S			

I-S means iron and steel or products made principally of iron and steel. Estimates are indicated by asterisks (*).
Daggers (†) indicate that the population given includes that of near-by suburbs.



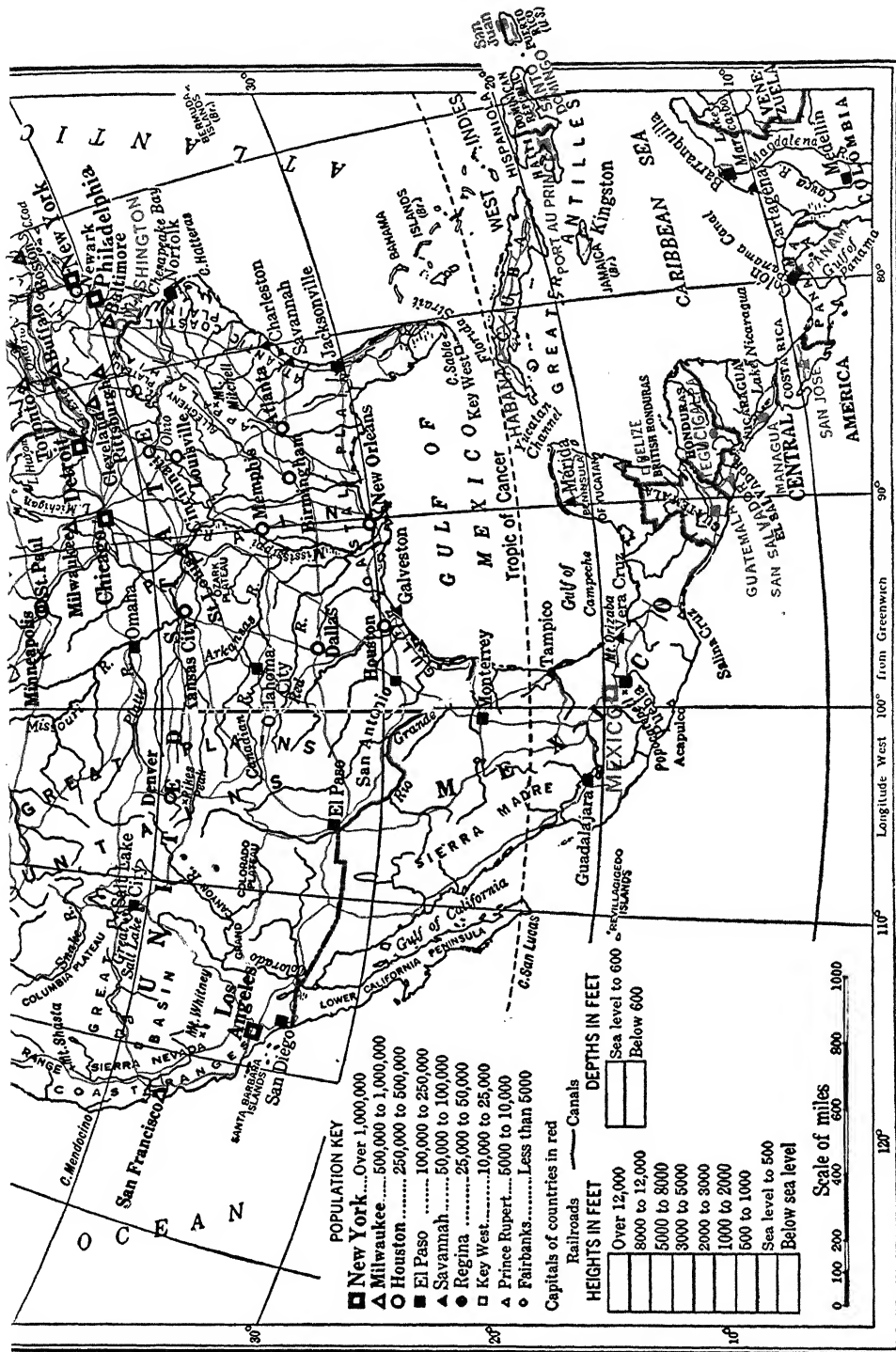


Table 1—Continued

CONTINENT, COUNTRY. STATE, ETC.	AREA IN SQ. M.	POPULATION	POPULATION OF PRINCIPAL CITIES (U.S. IN 1940)		
			Capital	Other Cities	
North America (Cont.):					
Canada	9,970,600	11,500,000	Ottawa	Ottawa	26,000
Montana	147,000	559,000	Helena	Butte	37,000
Nebraska	77,500	1,315,000	Lincoln	Omaha	223,000
Nevada	110,500	1,060,000	Carson City	Reno	21,000
New Hampshire	9,300	402,000	Concord	Manchester	77,000
New Mexico	8,200	4,160,000	Trenton	Newark	429,000
New York	122,600	13,531,000	Santa Fe	Albuquerque	33,000
North Carolina	49,200	3,479,000	Raleigh	Durham	74,434,000
North Dakota	52,400	3,523,000	Bismarck	Grand Forks	76,000
Ohio	70,100	6,908,000	Columbus	Cleveland	32,000
Oklahoma	41,000	2,336,000	Salt Lake City	Fargo	878,000
Oregon	96,700	1,080,000	Portland	Portland	142,000
Pennsylvania	45,100	9,900,000	Harrisburg	Philadelphia	363,000
Rhode Island	3,120	1,000,000	Providence	Pittsburgh	671,000
South Carolina	32,000	1,900,000	Columbia	Greenville	49,000
South Dakota	77,900	643,000	Pierre	Sioux Falls	34,000
Tennessee	265,900	2,916,000	Nashville	Albany	17,000
Texas	85,000	6,414,000	Austin	San Antonio	294,000
Utah	84,000	359,000	Salt Lake City	Provo	18,000
Vermont	9,600	359,000	Montpelier	Rutland	17,000
Washington	42,600	2,678,000	Richmond	Seattle	69,000
West Virginia	69,100	1,736,000	Olympia	Spokane	122,000
Wisconsin	24,200	1,902,000	Charleston	Madison	10,000
Wyoming	66,100	3,138,000	Cheyenne	Billings	67,000
West Indies	97,500	39,000	Nassau	Casper	17,000
Bahama Islands	4,400	13,467,000	Havana		
Cuba	44,200	4,227,000	Ciudad Trujillo	Santiago de Cuba	107,000
Dominican Republic	19,300	1,654,000	Port au Prince	Santiago	13,000
Haiti	10,200	2,690,000	Kingston	Spanish Town	25,000
Jamaica	10,200	1,153,000	San Juan	Fort de France	8,000
Jesser Antilles	4,800	1,603,000	Charlotte Amalie	Ponce	52,000
Puerto Rico	3,400	1,869,000		Christiansted	4,000
Virgin Islands	133	24,000			
South America:					
Argentina	*7,942,000	81,534,000	Buenos Aires	Rosario	514,000
Brazil	1,153,000	13,393,000	Sucre	La Paz	250,000
Chile	*457,000	3,457,000	Rio de Janeiro	Sao Paulo	1,322,000
Colombia	3,285,000	45,002,000	Georgetown	Valparaiso	263,000
Costa Rica	89,500	437,000	San Jose	San Jose	108,000
Cuba	290,100	4,679,000	San Pedro de Macoris	Barranquilla	162,000
Ecuador	*110,000	3,200,000	Quito	Guayaquil	180,000
El Salvador	34,800	37,000	Cayenne	Asuncion	35,000
Guatemala	*176,000	936,000	Lima	Callao	69,000
Honduras	*532,000	7,021,000	Managua	San Salvador	45,000
Paraguay	225,000	1,770,000	Trinidad	Caracas	203,000
Peru	1,280,000	3,580,000	Tirana		
Uruguay	394,000	550,000,000	Andorra La Velle		
Venezuela	*3,690,000	1,063,000			
Europe:					
Albania	10,000	30,000	Scutari	Koriza	22,000
Andorra	191	700			

Table 2—Continued

CONTINENT, COUNTRY, STATE, ETC.	PRINCIPAL PRODUCTS			PRINCIPAL EXPORTS	PRINCIPAL IMPORTS
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
N. America (Cont.):					
Alabama	Wheat, sheep & wool, cattle	Foodstuffs	Copper, zinc, silver		
Arizona	Cattle, sheep, livestock	Meat, dairy & grain products	Copper, silver, gold		
California	Cattle, sheep	Textiles, shoes, paper	Copper, silver, gold		
New Hampshire	Dairy products, garden truck	Textiles, petroleum prod., I-S	Stone, sand, gravel		
New Mexico	Cattle, sheep, cotton	Clothing, printing, paper, textiles	Clay, zinc, cement, stone		
New York	Dairy products, fruits, potatoes	Foodstuffs, petroleum prod., I-S	Copper, coal, zinc		
North Carolina	Wheat, dairy products, flaxseed	Foodstuffs	Cement, stone, clay		
North Dakota	Wheat, dairy products, corn, hogs	Foodstuffs, petroleum prod., I-S	Stone, sand, gravel, mica		
Ohio	Dairy products, corn, hogs	Foodstuffs, petroleum prod., I-S	Coal, natural gas, clay		
Oklahoma	Cotton, wheat, corn	Petroleum prod., cottonseed prod.	Petroleum, zinc, lead		
Oregon	Wheat, livestock, fruits, fish	Lumber & food products	Stone, sand, gravel		
Pennsylvania	Dairy products, garden truck	I-S, textiles, printing	Coal, cement, clay		
Rhode Island	Dairy products, tobacco	Textiles, jewelry	Stone		
South Carolina	Corn, wheat, cattle	Foodstuffs	Gold		
South Dakota	Corn, cotton, tobacco	Foodstuffs	Gold		
Tennessee	Corn, cotton, livestock	Lumber, foodstuffs, textiles	Coal, stone, cement		
Utah	Sheep, sugar beets, fruits	Petrol., natural gas, sulphur	Petrol., natural gas, sulphur		
Vermont	Dairy products, fruits, maple sugar	Copper, silver, gold	Copper, silver, gold		
Virginia	Dairy products, garden truck	Textiles, paper	Marble, granite, slate		
Washington	Wheat, fruits, dairy products, fish	Foodstuffs, petroleum prod., I-S	Coal, stone, clay, cement		
West Virginia	Corn, cattle, fruit	Foodstuffs, petroleum prod., I-S	Coal, nat. gas, clay, petrol.		
Wisconsin	Dairy products, corn, potatoes	Foodstuffs, machinery, paper	Stone, iron ore, sand		
Wyoming	Sheep, cattle, sugar beets	Petroleum products	Petroleum, coal, natural gas		
South America:					
Argentina	Sponges, sisal vegetables	Tobacco products	Iron ore, copper	Sponges, tomatoes, sisal	Liquor, I-S, textiles
Bolivia	Sugar, tobacco			Sugar, tobacco	Foodstuffs, textiles, machinery
Brazil	Sugar, cacao, coffee			Coffee, cotton, lumber	Foodstuffs, textiles, I-S
Chile	Coffee, cotton, lumber			Bananas, sugar, coffee	Foodstuffs, textiles, I-S
Colombia	Bananas, pimientos, sugar, coffee			Bananas, sugar, coffee	Foodstuffs, textiles, I-S
Ecuador	Sugar, cacao, coffee	Tobacco products, hats		Sugar, tobacco, coffee	Foodstuffs, textiles, I-S
French Guiana	Sugar, cattle	Sugar products		Sugar products	Foodstuffs, textiles, I-S
Guatemala	Wheat, corn, cattle, sheep	Foodstuffs, textiles, leather	Petroleum	Wheat, corn, animal products	Textiles, I-S, lumber products
Haiti	Corn, potatoes, barley, rubber	Textiles, paper	Tin, silver, copper	Coffee, cotton, animal prod.	Wheat, textiles, I-S
Honduras	Coffee, corn, sugar		Manganese, coal	Sugar, diamonds, rice	Foodstuffs, I-S, textiles
British Guiana	Sugar, rice, coconuts	Foodstuffs, leather, textiles	Diamonds, bauxite	Nitrates, copper, animal prod.	Textiles, foodstuffs, I-S
Colombia	Coffee, bar, livestock	Panama hats	Copper, platinum, petroleum	Coffee, petroleum, bananas	Textiles, foodstuffs, I-S
Costa Rica	Cacao, coffee, ivory, nuts		Petroleum, gold, silver	Cacao, gold	Foodstuffs, I-S, textiles
Cuba	Rice, cacao	Meat & its by-products	Gold	Animal prod., maté, quebracho	Textiles, other goods
Ecuador	Meat tea, quebracho, livestock	Textiles	Petroleum, copper, silver	Metals, petroleum, cotton	Foodstuffs, textiles, I-S
French Guiana	Corn, potatoes, cotton, sugar, wool	Animal products	Gold, bauxite	Sugar, coffee, bauxite	Foodstuffs, textiles, I-S
Guatemala	Rice, sugar, coffee	Petroleum products, textiles	Petroleum, asphalt	Animal products, wheat	Foodstuffs, textiles, I-S
Honduras	Coffee, cacao, livestock			Petroleum, coffee, cacao	Foodstuffs, textiles, I-S
Paraguay	Livestock, grain			Animal products	Textiles, cereals, metals
Peru	Livestock, grain			Textiles, lumber products, I-S	Cotton, wool, coal
Uruguay	Grain, potatoes, dairy products				
Venezuela					
Europe:					
Albania					
Andorra					
Austria					

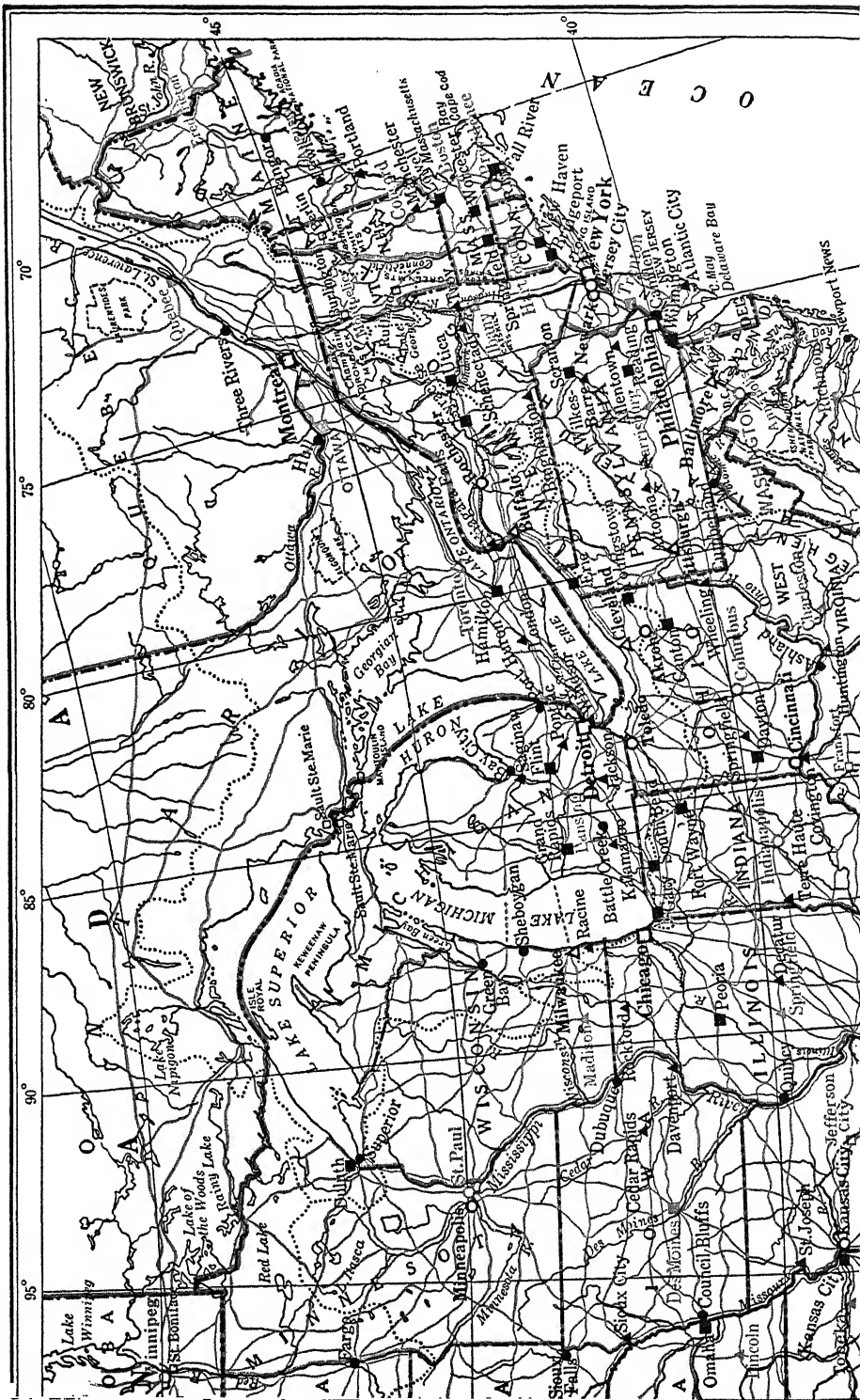
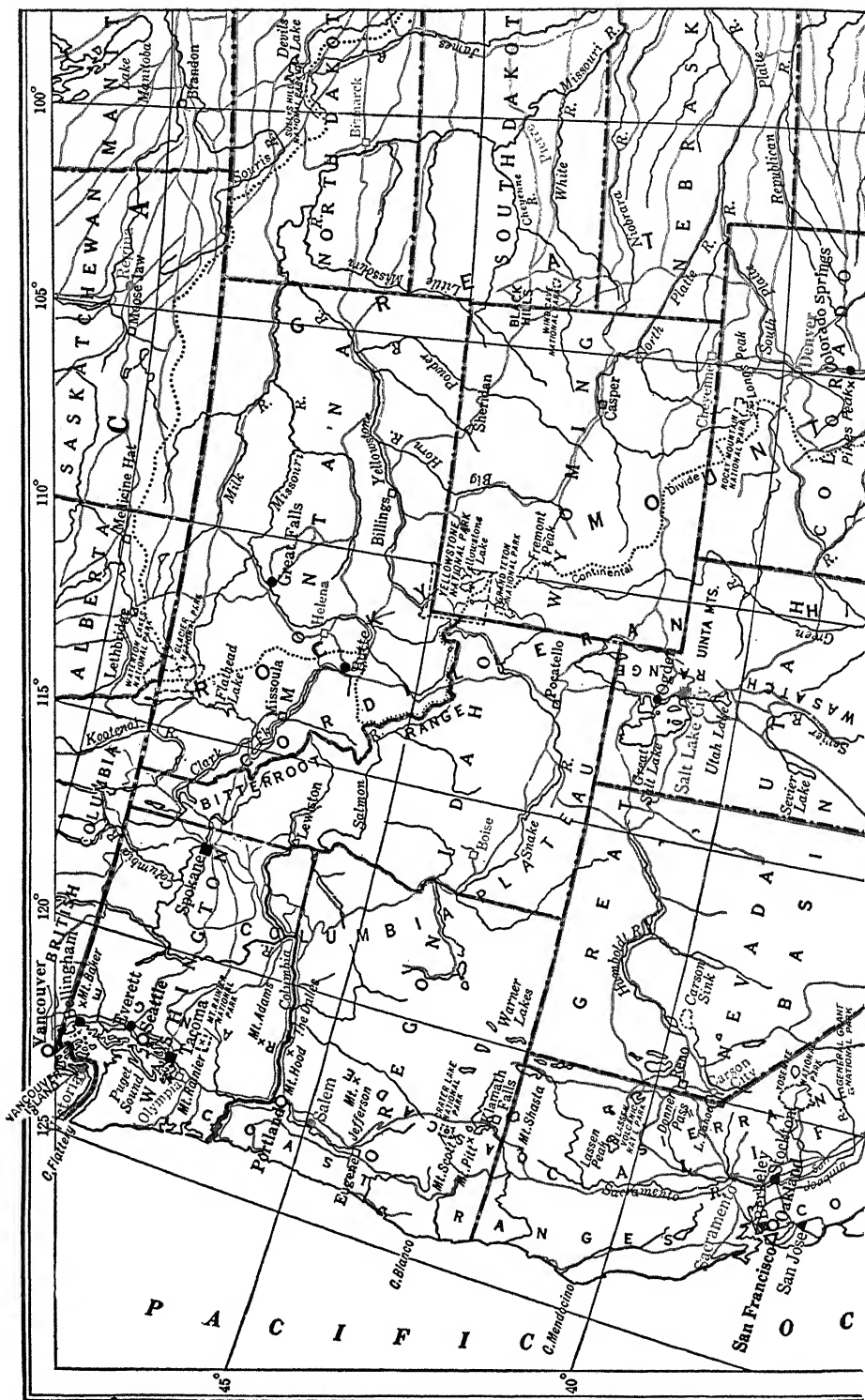


Table 1—Continued

CONTINENT, COUNTRY, STATE, ETC.	AREA IN SQ. MI.	POPULATION	POPULATION OF PRINCIPAL CITIES	
			Capital	Other Cities
Europe (Cont.):				
Belgium	11,800	8,386,000	Brussels	Antwerp
Bulgaria	39,800	2,376,000	Sofia	Philippopolis
Czechoslovakia	38,600	10,500,000	Prague	Brno
Denmark	16,000	3,844,000	Copenhagen	Aarhus
Estonia	18,400	1,133,000	Tallinn	Artu
Finland	114,000	2,400,000	Helsinki	Tampere
France	212,700	41,980,000	Paris	Marseille
Germany	225,000	79,612,000	Berlin	Hamburg
Great Britain & N. Ireland	94,600	47,502,000	London	Birmingham
England	59,900	39,050,000	London	Birmingham
Ireland	3,200	1,295,000	Dublin	Belfast
Northern Ireland	7,500	2,063,000	Edinburgh	Glasgow
Wales	7,500	2,063,000	Edinburgh	Glasgow
Greece	49,900	7,818,000	Athens	Piræus
Hungary	39,900	10,817,000	Budapest	Szeged
Iceland	39,700	120,000	Reykjavik	Skagway
Ireland (Irish Free State)	117,000	2,959,000	Dublin	Akureyri
Latvia	25,400	4,384,000	Riga	Libau
Lithuania	25,400	1,994,000	Kovno	Memel
Luxembourg	1,000	2,575,000	Luxembourg	Esch-sur-Alz
Monaco	33	301,000	Monaco	La Condamine
Netherlands	13,200	8,232,000	Amsterdam	Rotterdam
Norway	125,100	5,731,000	Oslo	Bergen
Poland	125,100	22,133,000	Warsaw	Łódź
Portugal	35,800	7,460,000	Lisbon	Oporto
Romania	122,300	19,933,000	Bucharest	Kishinev
Russia (U.S.S.R.), Europe*	1,607,800	139,621,000	Moscow	Leningrad
Spain	195,000	22,953,000	Madrid	Barcelona
Sweden	173,000	6,463,000	Stockholm	Göteborg
Switzerland	15,900	4,097,000	Bern	Zürich
Turkey in Europe	9,000	1,330,000	Istanbul	Adrianople
Vatican City	108.7 acres	1,000	Belgrade	Subotica
Yugoslavia	96,100	13,934,000	Belgrade	Kragujevac
Asia:				
Afghanistan	*10,900,000	950,000,000	Kabul	Kandahar
Aden	245,000	7,000,000	Aden	Gwadar
Albania	9,000	68,000	Quetta	Prome
Armenia	134,600	463,000	Punakha	Batumi
Barma	300,000	3,000,000	Rangoon	Calcutta
Burma	262,700	16,119,000	Rangoon	Calcutta
China	4,760,000	517,482,000	Peking	Shanghai
Chinese Republic	*4,233,000	457,835,000	Nanking	Shanghai
China (Groner)	*1,534,000	43,233,000	Mukden	Harbin
Manchuria	*363,000	43,233,000	Urga	Kashgar
Mongolia	*1,370,000	4,360,000	Urumchi	Shigatse
Sikkim	*590,000	3,722,000	Lassa	Lhasa
Tibet	*465,000	1,450,000	Lhasa	Karnak
Ceylon	3,801	1,155,000	Colombo	Katun
Hong Kong	3,801	1,155,000	Dahli	Bombay
India	1,408,000	365,900,000	Hanoi	Saigon
Indo-China	1,235,000	21,652,000	Baghdad	Mosul
Iran (Mesopotamia)	*177,100	3,560,000	Baghdad	Mosul

Table 2—Continued

CONTINENT, COUNTRY, STATE, ETC.	PRINCIPAL PRODUCTS			PRINCIPAL EXPORTS	PRINCIPAL IMPORTS
	Agricultural (including Forest and Fishery)	Manufactured	Mineral		
Europe (Cont.):					
Belgium	Grain, potatoes, sugar beets	I-S, textiles, chemicals, glass	Coal	I-S, textiles, glass	Foodstuffs, raw materials
Bulgaria	Wheat, corn, livestock	Simple mfg. of farm products	Coal	Tobacco, grain, animal prod.	Textiles, I-S
Czechoslovakia	Grain, potatoes, sugar beets	Textiles, glassware, I-S, sugar	Coal, iron ore	Textiles, sugar, I-S, fuels	Cereals, raw cotton & wool, mach.
Denmark	Livestock, dairy products, fish	Foodstuffs	Oil shale	Dairy & meat products	Grain, manufactured goods
Estonia	Grain, potatoes, dairy products	Textiles, lumber products		Dairy & lumber prod., textiles	Foodstuffs, cotton, I-S
Finland	Rye, oats, potatoes, beets	Lumber products, textiles	Iron ore, coal	Lumber products	Foodstuffs, textiles, mfgd. goods
France	Wheat, corn, livestock, fish	Textiles, I-S, chemicals	Coal, potash	Wool, I-S, textile goods	Raw materials, machinery
Germany	Grain, potatoes, sugar beets	I-S, textiles, food products	Coal, iron ore	I-S, textiles, chemicals	Foodstuffs, raw materials
Gt. Brit., N. I.	Grain, livestock, fish	Textiles, I-S	Coal, iron ore	Textiles, I-S, coal	Flour, meat, raw materials
Nor. Ireland	Wheat, cattle, sheep, fish	Linen products, ships	Peat, stone		
Scotland	Livestock, oats, fish	Ships, I-S, textiles	Coal, iron ore		
Sweden	Wheat, cattle, sheep, fish	Ships, I-S, textiles	Coal, iron ore		
Greece	Tobacco, olives, grapes, wheat	Textiles, leather goods, soap	Several metals	Tobacco, wine, currants	Foodstuffs, textiles, mfgd. goods
Hungary	Grain, livestock, sugar beets	Food products, I-S	Coal, bauxite	Foodstuffs, I-S	Textiles, lumber, mfgd. goods
Iceland	Fish, sheep, potatoes	Textiles		Fish & animal products	Textiles, textiles, lumber
Ireland	Oats, potatoes, livestock, fish	Foodstuffs, textiles		Animals & animal products	Foodstuffs, coal, I-S
Eire (I. F. S.)	Wheat, grapes, olives	Foodstuffs, I-S, foodstuffs	Sulphur, marble	I-S, textiles, autos, veg., fruits	Foodstuffs, raw mat., mfgd. goods
Italy	Wheat, grapes, olives	Foodstuffs, I-S, foodstuffs		Foodstuffs, animal products	Foodstuffs, raw mat., mfgd. goods
Lithuania	Rye, oats, potatoes, livestock	Foodstuffs, I-S, foodstuffs		Lumber, animal products, flax	Textiles, foodstuffs, fertilizers
Luxemburg	Oats, potatoes, livestock	Lumber products	Iron ore	I-S, leather	Foodstuffs, coal
Monaco	Grapes, olives	I-S, leather			
Netherlands	Dairy & horticultural products, fish	Textiles, ships, foodstuffs	Coal, salt	Foodstuffs, textiles, other mfgs.	Raw materials, fuel, I-S
Norway	Livestock, fish, livestock	Lumber products, chemicals	Pyrites, iron ore, copper	Lumber & fish prod., minerals	Foodstuffs, raw mat., machinery
Poland	Wheat, corn, livestock, fish	Lumber products, chemicals	Coal, potash	Wine, fish, cork	Foodstuffs, fuel, mfgd. foodstuffs
Portugal	Grain, fruits, fish	Textiles, tile, cork	Coal, copper, pyrites	Food, petrol., lumber products	Textiles, machinery, mfgd. goods
Romania	Corn, fruits, fish	Refined metals, textiles, foodstuffs	Petroleum, lignite	Grain, lumber, oil	Raw material machinery, textiles
Rumania	Corn, wheat, fruits	Lumber & text. prod., ref. metals	Petroleum, iron ore, coal	Wine, olives, fruits	Foodstuffs, raw mater., machinery
U.S.S.R. (Russia)	Grain, potatoes, livestock	Textiles, paper	Coal, iron, copper	Textile machinery, dairy pr.	Foodstuffs, textiles, coal
Spain	Wheat, olives, grapes	Woolen products, I-S, ships	Iron ore	Tobacco, rugs	Manufactured goods
Switzerland	Grain, potatoes, livestock	Woolen products, I-S, ships			
Sweden	Dairy, potatoes, livestock	Woolen products, I-S, ships			
Turkey	Wheat, tobacco, livestock	Rugs, perfume, embroideries			
Vatican City					
Yugoslavia	Grain, livestock, fruits	Foodstuffs, carpets	Lignite, iron ore, bauxite	Animal prod., wheat, lumber	Textiles, I-S, fuel
Asia:					
Afghanistan	Grain, fruits, sheep	Rugs, simple clothing		Fruits, rugs, skins	Textiles, sugar, metals
Albania	Cattle, sheep, skins	Simple, homemade products	Salt	Coffee, hides, skins & skins	Textiles, sugar, metals
Baluchistan	Grain, fruit, sheep, camels	Simple, homemade products		Grain, fruits, wool	Manufactured goods
Bhutan	Rice, corn, millet	Guins, swords		Petroleum, rice, teak	Textiles, I-S, coal
Burma	Rice, millet, teak	Simple, homemade products	Petroleum, silver	Tea, rubber, coconut prod.	Rice, textiles, coal
Ceylon	Rice, coconuts, tea, rubber	Simple, homemade products	Gems		Textiles, I-S, rice
Chinese Republic	Rice, wheat, vegetables, cotton	Simple, homemade products	Antimony, tungsten, coal	Silk, bean products, tea	Textiles, I-S, rice, tobacco
China	Wheat, beans, millet	Foodstuffs	Coal, oil shale	Bean products	Manufactured goods
Manchuria	Cattle, sheep	Carpets, other textiles	Jade, gold	Wool, hides & skins	Manufactured goods
Mongolia	Grain, fruits, vegetables	Rugs, crude print cottons		Gold, jade, carpets	Mfgd. goods, foodstuffs
Sinkiang	Barley, livestock	Foodstuffs, handmade cloth	Asbestos, copper, gypsum	Hides, skins, rugs	Foodstuffs, fuel, mfgd. goods
Tibet	Grain, grapes, potatoes	Cotton & jute textiles	Coal, manganese, lead	Jute, cotton, grain, oilseeds	Textiles, I-S, sugar
Hong Kong	Rice, wheat, cotton, sugar	Simple, homemade products	Petroleum	Rice, coal, fish	Textiles, I-S, sugar
India	Rice, bananas			Grain, fruits, petroleum	Manufactured goods
Indo-China	Grain, fruits, sheep				
Iraq					



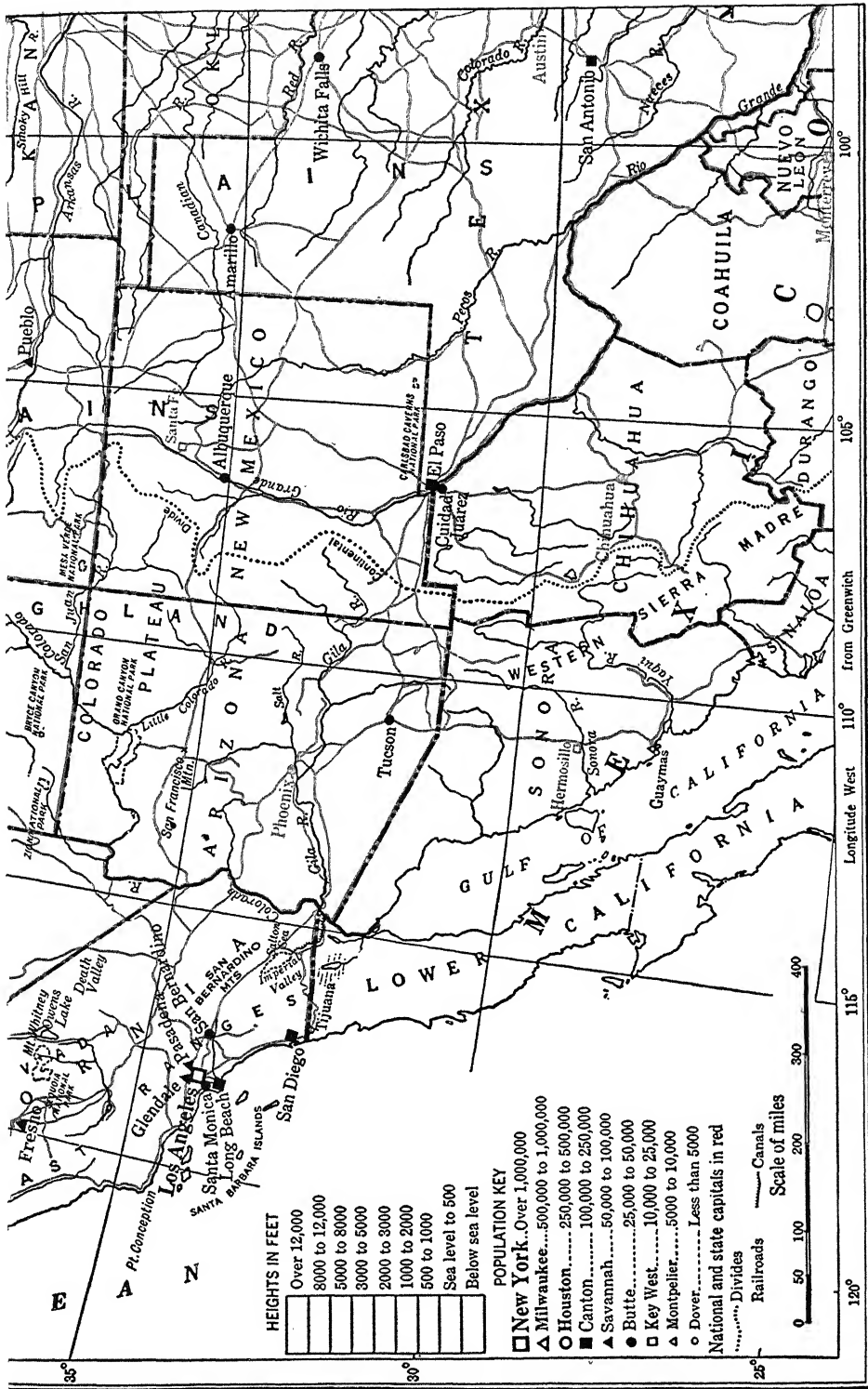
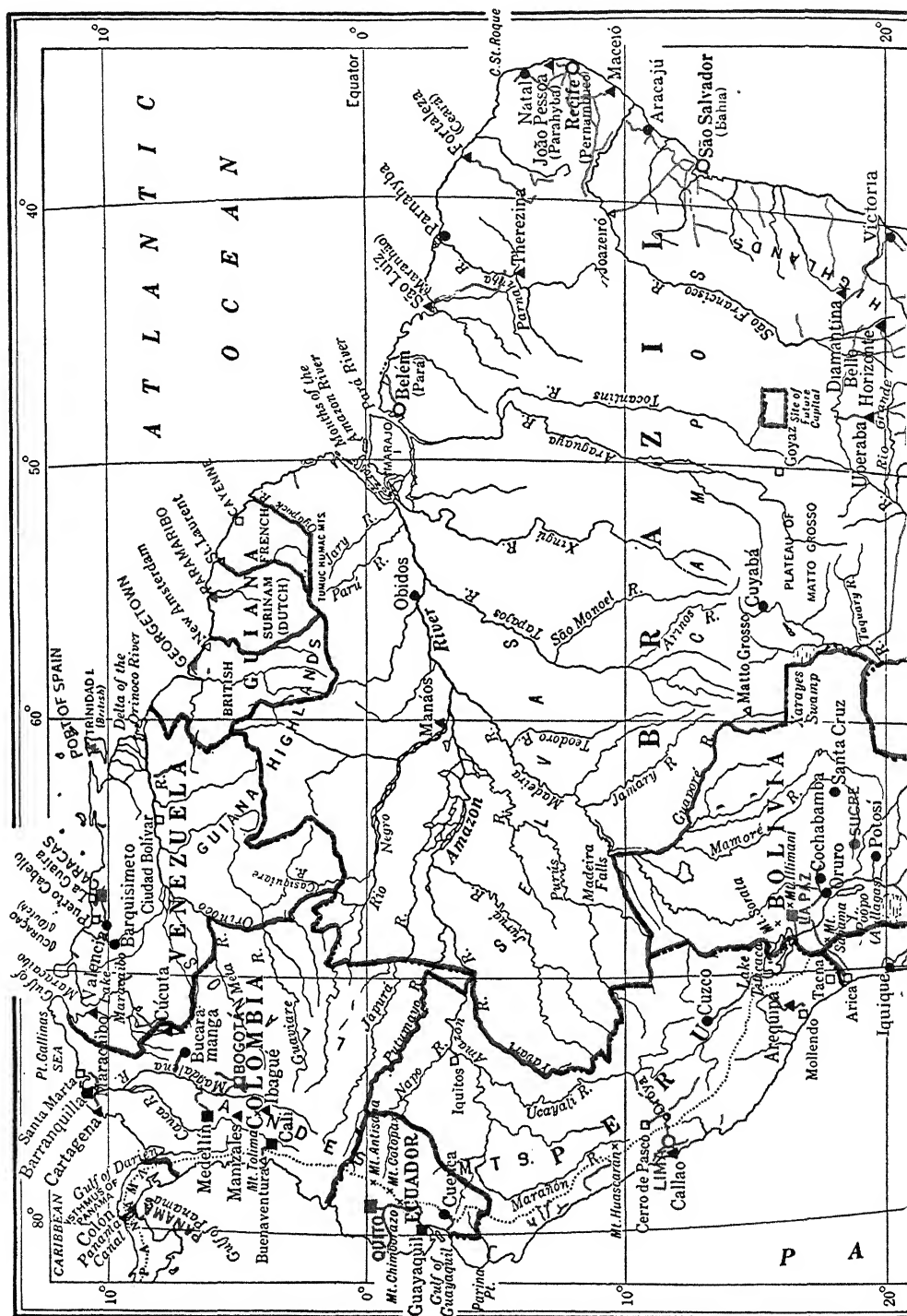


Table 1—Continued

Continent, Country, State, etc.	Area in Sq. M.	Population	Capital	Other Cities
Asia (Cont.):				
Japanese Empire	265,100	105,225,000	Tokyo	Osaka
Japan (proper)	378,400	72,875,000	Tokyo	Nagoya
Korea	100,000	22,339,000	Seoul	Pusan
Kwantung	13,900	2,339,000		Pusan
Taiwan (Formosa)	34,800	5,009,000		Tainan
Lebanon	*1,000	569,000	Beirut	Taihouk
Malay Peninsula	56,600	3,500,000	Singapore	Tripoli
Malaya	*373,000	3,000,000	Riyadh	Georgetown
Nepal	*146,000	1,195,000	Katmandu	Pacca
Oman	*82,000	6,500,000	Aden	108,000
Palestine	*10,000	1,435,000	Jerusalem	127,000
Persia (Iran)	628,000	15,000,000	Tehran	Tel-Aviv
Russia in Asia	*4,632,700	40,600,000	Bangkok	Sverdlovsk
Siam (Thailand)	209,100	14,464,000	Yamouso	Chiengmai
Sri Lanka	65,600	2,450,000	Colombo	177,000
Trans-Jordan	70,000	350,000	Amman	
Turkey in Asia	273,800	15,770,000	Ankara	184,000
Yemen	*75,000	3,500,000	Sana'a	40,000
Africa:				
Algeria	*1,090,000	15,500,000	Algiers	Ona
Anglo-Egyptian Sudan	1,098,100	6,189,000	Khartoum	114,000
Angola	480,100	3,200,000	Luanda	40,000
Belgian Congo	*938,000	9,485,000	Nova Lisboa	Mossamedes
British East Africa	*694,000	14,941,000	Leopoldville	Matadi
Egypt	*383,000	13,920,000	Cairo	Monbassa
French Equatorial Africa	*1,915,000	13,500,000	Algiers	Port Said
French West Africa	*1,835,000	14,944,000	Dakar	Porto Novo
Gambia	*11,000	250,000	Bathurst	
Ghana	*110,000	2,500,000	Accra	
Libya	*46,000	2,500,000	Monrovia	
Madagascar	*423,000	888,000	Tripoli	Mursak
Mali	*221,000	3,469,000	Bamako	
Mozambique	*485,000	3,469,000	Manzanique	Matatse
Nigeria	*375,700	20,641,000	Lagos	Port Harcourt
Northern Rhodesia	*287,800	1,400,000	Livingstone	1,000
Southern Rhodesia	*149,000	1,435,000	Salisbury	
South-West Africa	*322,800	365,000	Windhoek	
Tunisia	48,300	2,700,000	Tunis	
Union of South Africa	471,500	9,859,000	Pretoria	
Australia & Pacific Islands:				
Australia	*3,300,000	9,700,000	Sydney	
New South Wales	*2,974,600	7,137,000	Cadbury	
Victoria	309,400	2,770,000	Melbourne	
Western Australia	523,600	6,000	Perth	
Northern Territory	1,017,000	1,017,000	Adelaide	
South Australia	380,100	507,000	Adelaide	
Tasmania	90,200	236,000	Hobart	
Vanuatu	87,900	1,881,000	Melbourne	
Western Australia	*975,900	465,000	Perth	
New Zealand	103,700	1,640,000	Wellington	
Borneo (British)	31,000	392,000	Sundakan	
British East Indies	731,700	69,355,000	Manila	
Philippines	11,000	10,000,000	Manila	
Hawaiian Islands	6,400	423,000	Honolulu	



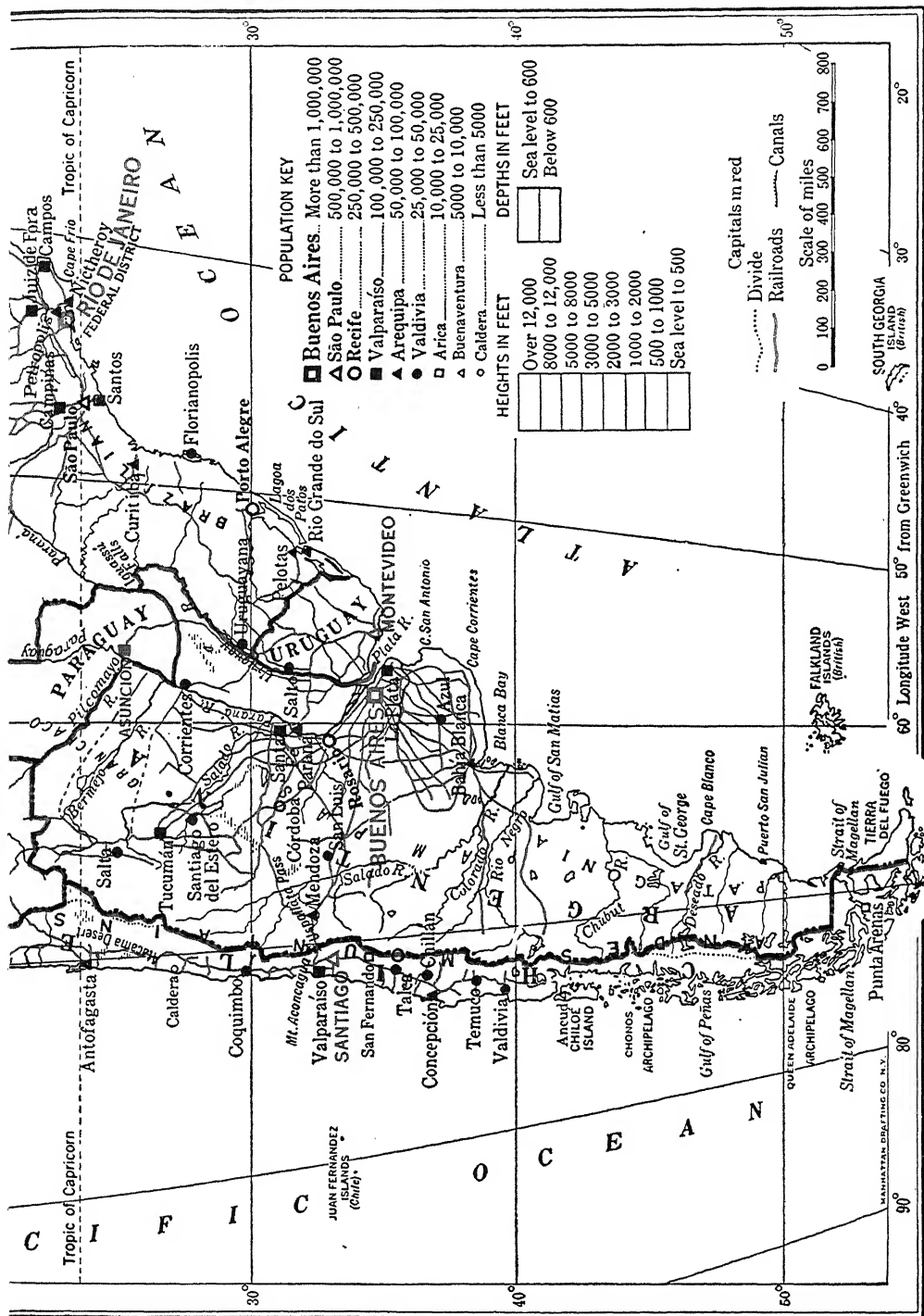


Table 3 WHEAT: Acreage and Production

	Acreage (millions of acres)					Production (millions of bus.—60 lbs.)				
	1909-13 average	1925-26 average	1930-31 average	1936-37	1937-38	1909-13 average	1925-26 average	1930-31 average	1936-37	1937-38
World total ¹	278.2	314.2	339.9	345.8	356.6	3,798	4,414	4,722	4,667	....
United States.....	47.1	58.3	54.2	48.9	64.5	690	823	733	627	874
Canada.....	9.9	23.1	25.7	25.6	25.6	197	431	349	219	182
Argentina.....	16.1	19.0	17.7	15.9	15.3	147	243	244	249	184
Europe:										
United Kingdom.....	1.8	1.6	1.5	1.8	1.8	56	52	51	65	55
France.....	16.5	13.2	13.3	12.9	12.8	326	291	305	255	254
Spain.....	9.5	10.7	11.2	10.8	....	130	146	158	122	....
Italy.....	11.8	12.0	12.2	12.7	12.8	184	229	253	225	296
Germany.....	4.0	4.1	5.3	5.2	4.9	131	120	170	163	164
Yugoslavia.....	4.0	4.6	5.1	5.5	5.3	62	81	80	107	86
Hungary.....	3.7	3.8	3.9	4.0	3.8	71	80	77	88	70
Rumania.....	9.5	7.7	7.7	8.5	8.8	159	106	103	129	138
Poland.....	3.3	3.3	4.3	4.3	4.2	62	61	74	78	68
Russia (including Asiatic).....	74.0	71.0	85.8	96.1	101.7	757	791	925	1,333	....
Bulgaria.....	....	2.7	3.1	3.0	3.2	....	40	53	60	65
Czechoslovakia.....	....	1.8	2.1	2.3	2.1	....	46	54	56	51
Africa: Egypt.....	....	1.6	1.6	1.5	1.4	....	40	43	46	45
Morocco.....	....	2.6	2.9	3.2	2.7	....	25	30	12	18
Algeria.....	7.8	3.7	3.9	4.3	4.1	92	30	33	30	34
Tunisia.....	....	1.7	2.0	1.2	2.4	....	12	13	8	18
Asia: India.....	29.2	31.5	33.3	33.6	33.2	352	320	356	352	366
Turkey.....	....	6.7	7.6	8.8	8.3	....	68	93	138	140
Australia.....	7.6	12.8	15.2	12.3	13.8	90	136	186	151	181

Table 4 WHEAT: Yield per Acre (Bushels)

	1909-13 average	1926-30 average	1931-35 average	1936-37	1937-38		1909-13 average	1926-30 average	1931-35 average	1936-37	1937-38
United States.....	14.7	14.1	13.5	12.8	13.6	Hungary.....	19.3	20.8	19.4	21.8	18.5
Canada.....	19.8	18.6	13.6	8.6	7.1	Rumania.....	16.7	13.6	13.4	15.2	15.7
United Kingdom.....	31.2	35.8	35.6	34.3	34.5	Poland.....	18.4	18.3	17.4	18.2	16.2
France.....	19.7	22.0	23.0	19.8	19.9	U. S. S. R. (Russia) (including Asiatic).....	10.2	11.1	10.8	13.9	13.5
Spain.....	13.7	13.7	14.1	11.3	....	India.....	12.0	10.2	10.7	10.5	11.0
Italy.....	15.6	19.0	20.8	17.7	23.1	Argentina.....	9.2	12.8	15.8	15.7	12.1
Germany.....	32.6	29.4	32.1	31.6	33.6	Australia.....	11.9	10.6	12.2	12.2	13.1
Yugoslavia.....	15.6	17.7	15.6	19.7	16.4						

Table 5 WHEAT: World Trade (Including Flour in Terms of Wheat)
[In thousands of bushels of 60 pounds]

	1925-1929 average		1930-1934 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters:								
Canada.....	306,094	821	224,270	376	187,647	521	264,867	383
United States.....	173,535	14,676	84,021	14,913	15,731	38,933	19,079	53,226
Argentina.....	163,164	7	137,034	1	146,313	0	63,209	0
Australia.....	95,770	3	124,500	3	101,433	3	97,860	2
Hungary.....	22,164	105	18,111	2	14,820	0	24,044	0
U. S. S. R. (Russia).....	16,153	3,449	49,678	1,394	27,960	1,221	4,968	633
British India.....	13,275	7,706	4,760	3,988	2,304	742	9,287	580
Rumania.....	6,237	498	11,208	14	9,278	5	22,443	3
Principal importers:								
United Kingdom.....	12,360	217,084	9,859	227,408	6,915	208,375	6,162	208,209
Germany.....	11,898	87,909	15,203	33,056	1,166	5,976	3,227	2,752
Italy.....	2,328	82,586	6,193	40,337	10,456	20,322	7,735	19,654
France.....	633	46,713	18,415	53,678	37,908	28,793	18,343	22,015
Belgium.....	2,960	43,576	3,684	47,709	2,293	38,928	2,078	43,994
Brazil.....	19	32,522	11	32,190	0	34,697	0	36,371
Netherlands.....	1,297	29,647	1,080	29,447	1,381	21,562	279	20,404
Japan.....	5,819	22,840	10,737	22,003	14,637	16,458	6,576	12,540

¹ Excluding China.

Table 6

RYE: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 56 pounds)				
	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38
World total ¹	111.2	107.3	114.2	122.8	111.6	1,768	1,559	1,812	1,752	...
United States.....	2.2	4.8	3.5	2.8	3.8	36	64	45	26	49
Canada.....	.1	1.4	1.0	.6	.9	2	20	15	4	6
Europe:										
Sweden.....	1.0	.8	.7	.5	.5	24	22	18	14	17
Belgium.....	.7	.6	.6	.4	.4	24	21	21	14	14
France.....	3.1	2.2	1.9	1.6	1.6	53	41	33	28	29
Spain.....	2.0	1.8	1.7	1.5	1.4	28	28	22	18	20
Germany.....	12.7	10.7	11.6	11.0	10.0	368	256	296	291	366
Austria.....	1.1	.9	.9	.9	.9	24	16	20	19	17
Czecho-Slovakia.....	2.6	2.1	2.4	2.9	2.4	64	52	62	57	58
Hungary.....	1.6	1.6	1.6	1.6	1.5	31	27	29	28	23
Poland.....	12.6	12.9	13.7	14.4	14.1	225	207	244	251	222
Lithuania.....	1.7	1.4	1.2	1.2	1.3	24	23	20	21	24
U. S. S. R. (Russia) (including Asiatic).....	61.9	59.7	66.8	64.4	....	743	680	867	841	....

Table 7

BARLEY: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 48 pounds)				
	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38
World total.....	91.3	78.7	107.2	109.6	111.3	1,842	1,514	1,894	2,186	2,152
United States.....	7.6	7.2	11.2	8.4	10.0	185	160	278	147	220
Canada.....	1.6	3.0	4.7	4.4	4.3	45	77	114	72	83
Denmark.....	.6	.7	.9	.9	.9	27	32	44	41	50
United Kingdom.....	1.8	1.5	1.2	.9	.9	65	52	47	34	30
France.....	2.0	1.7	1.8	1.8	1.8	53	44	50	47	46
Czecho-Slovakia.....	2.3	1.7	1.8	1.6	1.7	71	50	59	47	51
Germany.....	3.5	3.2	3.7	4.0	4.2	134	100	134	156	167
Poland.....	3.1	2.5	3.0	2.9	3.0	68	50	69	64	63
U. S. S. R. (Russia).....	26.2	14.8	18.2	20.2	21.6	418	188	271	374	....
Spain.....	3.5	4.3	4.5	4.5	....	75	92	94	37	....
Rumania.....	3.4	4.3	4.5	4.0	3.8	62	55	88	74	42
Turkey.....	....	....	3.1	4.5	4.4	....	....	61	99	105
Algeria.....	3.4	3.0	3.5	3.1	3.0	46	31	35	29	27
Morocco, French.....	3.0	2.9	3.0	4.1	4.2	38	40	39	70	35
India, British.....	8.9	7.5	7.4	6.1	....	145	134	112	109	....
Japan (proper).....	3.0	2.6	2.3	1.9	1.9	96	82	81	69	72
Chosen.....	1.6	2.1	2.2	2.6	2.7	32	37	37	47	63
China.....	....	....	16.3	16.2	14.7	....	....	362	374	293

Table 8

OATS: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 32 pounds)				
	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38
World total.....	143.2	132.6	149.0	140.0	140.4	4,526	3,992	4,685	4,040	4,437
United States.....	37.4	42.4	41.5	33.4	35.1	1,143	1,251	1,275	786	1,146
Canada.....	9.6	14.6	13.0	13.3	13.0	374	487	411	289	285
Sweden.....	2.0	1.8	1.7	1.7	1.6	86	75	83	83	87
Denmark.....	1.2	1.1	1.0	.9	.9	61	61	67	58	70
United Kingdom.....	4.0	3.4	3.0	2.5	2.3	207	163	169	139	129
Eire (Irish Free State).....	.7	.7	.7	.6	.6	44	36	46	36	40
Belgium.....	.7	.7	.7	.5	.5	44	41	47	38	36
France.....	10.1	8.5	8.6	8.7	8.0	368	301	346	290	314
Czecho-Slovakia.....	2.5	2.0	2.1	1.9	1.9	96	82	98	84	95
Germany.....	9.5	8.2	8.6	6.9	7.0	527	363	451	387	408
Poland.....	6.8	4.4	5.8	5.6	5.7	194	121	196	182	161
U. S. S. R. (Russia).....	41.3	25.8	42.4	43.5	43.2	925	523	1,060	1,259	....
Italy.....	1.3	1.2	1.3	1.1	1.1	38	38	41	32	43
Spain.....	1.3	1.6	1.9	1.4	....	29	36	42	38	....
Rumania.....	2.1	3.1	2.8	2.0	1.9	60	63	76	38	35
Argentina.....	2.0	1.8	2.6	2.0	1.8	54	59	63	55	48

¹ Excluding China.



MAP OF EUROPE

Table 9

CORN: Acreage and Production

	Acreage (millions of acres)					Production (millions of bushels of 56 pounds)				
	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38
World total.....	175.6	180.8	194.2	214.0	209.1	4,190	4,291	4,402	4,003	4,942
Northern Hemisphere:	153.7	154.8	160.0	174.8	175.1	3,745	3,702	3,707	3,141	4,256
United States.....	104.2	102.6	99.5	93.0	93.8	2,712	2,724	2,591	1,507	2,645
Percent of world total.....	59.3	55.9	51.2	43.5	44.9	64.7	63.8	58.8	37.6	53.5
Mexico.....	6.1	7.6	7.7	7.0	....	133	85	73	63	....
Europe.....	29.6	30.4	36.8	39.4	39.1	633	591	705	922	915
Italy.....	4.1	3.8	3.7	3.7	3.6	103	95	97	120	135
Yugoslavia.....	4.8	4.8	5.4	6.7	6.5	112	109	118	204	210
Hungary.....	2.2	2.4	2.6	2.8	3.0	61	58	64	102	106
Rumania.....	9.6	8.8	10.9	13.0	12.8	193	141	183	221	186
U. S. S. R. (Russia).....	3.2	5.2	8.6	6.8	6.6	52	91	136	110	....
Egypt.....	1.7	2.0	2.1	1.6	1.6	64	69	76	63	65
India.....	6.4	5.9	6.4	6.4	....	83	82	84	91	....
Southern Hemisphere:	21.9	26.0	32.1	39.2	34.0	445	569	695	862	664
Brazil.....	6.0	7.0	9.0	....	....	140	177	172	222	....
Argentina.....	8.7	8.1	10.2	11.9	7.5	192	227	305	380	177
Union of South Africa.....	2.3	4.5	5.4	6.1	....	34	57	68	100	65
Java and Madura.....	3.0	3.9	4.8	5.5	....	42	58	71	87	....

Table 10

CORN: Yield per Acre (Bushels of 56 Pounds)

	1909-13 average	1921-26 average	1926-30 average	1936-37		1909-13 average	1921-26 average	1926-30 average	1936-37
	average	average	average	average		average	average	average	average
United States.....	26.0	26.5	26.0	16.2	Egypt.....	37.7	34.8	37.0	39.8
Mexico.....	13.5	11.3	11.2	8.9	India.....	13.9	13.9	13.3	14.2
Italy.....	25.1	24.9	26.1	32.6	Brazil.....	23.3	25.4	18.6	....
Yugoslavia.....	23.4	23.0	21.7	30.5	Argentina.....	22.0	28.0	29.6	30.1
Hungary.....	27.7	23.9	24.1	36.3	Union of South Africa.....	14.6	12.8	12.0	11.0
Rumania.....	20.0	16.0	16.9	17.0	Java and Madura.....	14.0	14.9	16.1	15.2
U. S. S. R. (Russia).....	16.1	17.4	16.4	16.2					

Table 11

RICE: Acreage and Production

	Acreage (thousands of acres)					Production (millions of pounds)				
	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38	1909-13 average	1921-25 average	1926-30 average	1936-37	1937-38
World total ¹.....	....	....	....	....	....	109,000	126,000	128,800	140,000	....
United States.....	716	921	966	969	1,093	660	990	1,196	1,361	1,472
India, British.....	67,004	81,400	80,327	83,556	68,807	64,144	70,270	68,451	73,835	69,655
Japan (proper).....	7,300	7,705	7,825	7,859	7,884	15,787	18,107	19,137	21,155	20,835
Chosen (Korea).....	2,905	3,824	3,922	3,924	4,015	3,293	4,556	4,964	6,698	8,275
Taiwan (Formosa).....	1,193	1,262	1,443	1,685	1,623	1,413	1,747	2,122	3,097	2,941
Indo-China, French.....	8,550	11,949	13,577	12,355	....	7,332	7,704	8,183	8,519	....
Siam.....	4,555	5,964	6,665	5,525	7,196	4,258	6,065	6,275	4,450	6,390
Philippine Islands.....	2,817	4,229	4,434	....	....	1,213	2,744	3,097	2,901	2,778
Brazil.....	228	1,029	1,363	....	....	100	1,033	1,264	....	....
Madagascar.....	1,009	1,298	1,370	....	....	896	1,322	992	....	....
Java and Madura.....	6,903	8,014	8,627	7,524	7,506	6,433	7,055	7,776	....	....

Table 12

RICE: World Trade (Millions of Pounds)

	1909-13 average		1921-25 average		1925-29 average		1935		1936	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
World total.....	10,718	12,454	11,239	13,593	10,769	13,855	10,236	12,453	8,392	8,496
Principal exporters:										
United States.....	210	16	59	317	60	252	52	165	113	22
Italy.....	4	142	5	242	3	429	7	281	3	313
India, British.....	278	5,338	272	4,558	224	4,888	548	3,772	358	3,023
Indo-China (French).....	0	2,288	13	2,974	0	3,403	2	3,585	5	3,735
Siam.....	0	1,929	0	2,795	1	3,101	0	3,282	....	....
Principal importers:										
Cuba.....	262	0	393	0	461	0	494	0	....	....
France.....	518	79	467	75	532	169	918	51	1,825	37
Germany.....	914	397	708	203	848	325	421	61	381	56
Netherlands.....	779	476	217	98	272	224	216	213	324	251
United Kingdom.....	769	91	398	21	260	16	244	5	249	4
Malaya, British.....	2,000	1,299	1,385	567	1,960	623	1,777	434	1,919	430
Ceylon.....	822	0	859	0	1,048	0	1,228	0	1,190	0
China.....	705	0	1,549	5	2,024	6	2,329	14	580	59
Netherland India.....	1,178	132	1,231	55	1,303	51	856	54	....	....
Japan.....	656	62	988	18	961	14	87	47	122	17

¹ Excluding Chira whose 1936-37 crop was estimated at 109 649,088,000 pounds.

Table 13

RICE: Yield per Acre (Pounds)

	1909- 1913 aver- age	1921- 1925 aver- age	1936- 1937	1937- 1938		1909- 1913 aver- age	1921- 1925 aver- age	1936- 1937	1937- 1938
United States.....	922	1,075	1,405	1,290	Indo-China, French....	858	645	689	.....
India.....	957	863	884	1,018	Siam.....	935	1,017	805	888
Japan.....	2,163	2,350	2,692	2,643	Philippine Islands.....	431	649	.....	.....
Chosen (Korea).....	1,134	1,191	1,554	2,061	Madagascar.....	888	1,018	.....	.....
Taiwan (Formosa).....	1,184	1,384	1,838	1,812	Java and Madura.....	932	880	1,170	1,130

Table 14

POTATOES: Acreage and Production

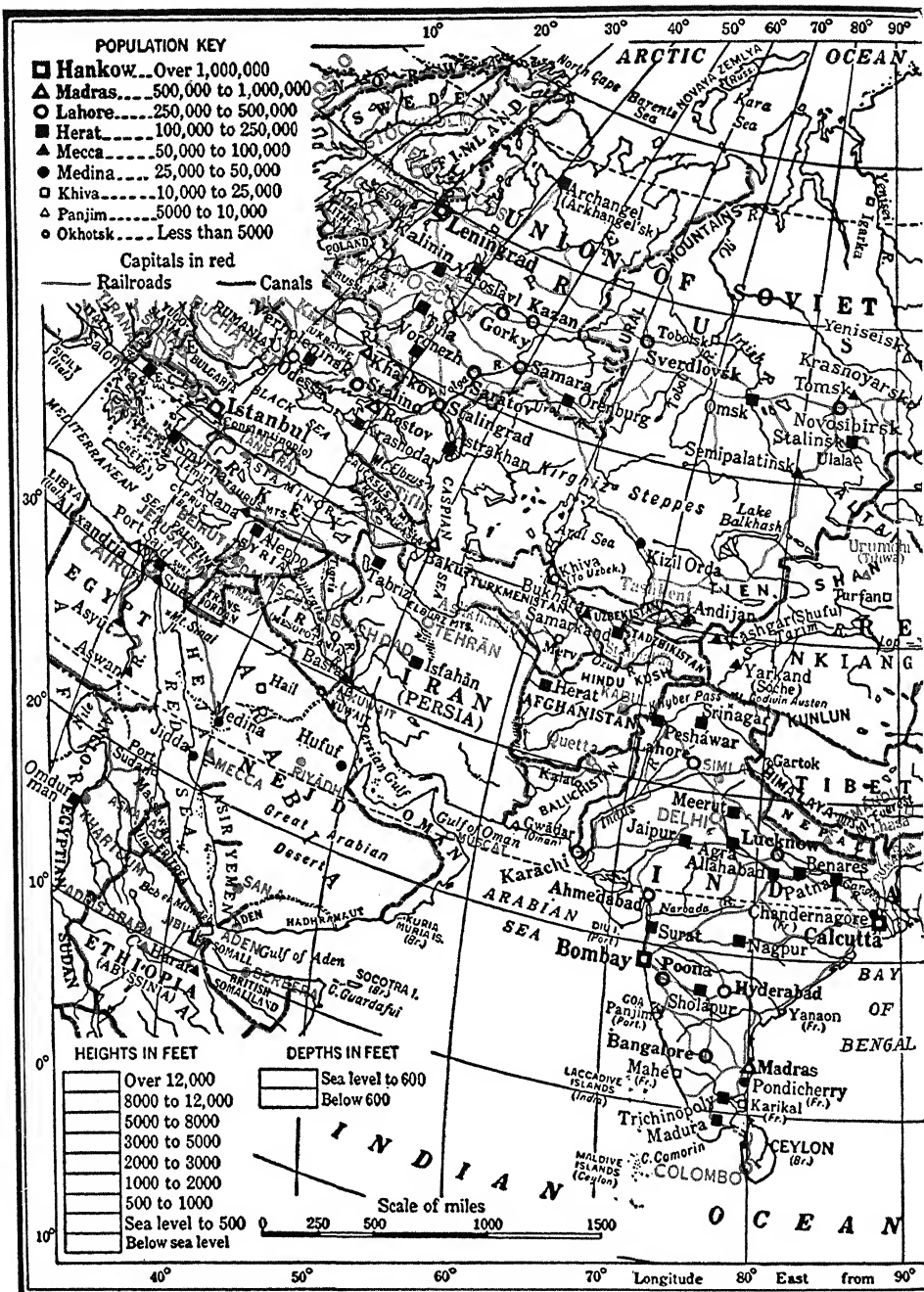
	Acreage (1,000 acres)				Production (1,000 bushels of 60 pounds)			
	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38
World total ¹	43,000	48,000	52,000	.....	6,660,800	7,562,100	8,815,500	.....
United States.....	3,064	3,426	3,063	3,177	349,434	369,907	331,918	391,159
Canada.....	552	556	496	531	74,579	76,934	65,057	71,055
United Kingdom.....	800	753	722	715	198,500	185,008	171,178	183,530
Eire (Irish Free State).....	369	345	334	326	87,856	92,054	90,378	101,036
Norway.....	120	119	127	128	31,592	31,986	34,753	31,636
Sweden.....	366	331	330	329	63,397	68,888	67,008	64,925
Denmark.....	173	175	187	200	36,243	43,094	47,344	49,236
Netherlands.....	432	395	322	836	118,097	109,253	92,099	91,858
Belgium.....	408	412	392	392	124,585	131,758	118,512	113,567
France.....	3,606	3,495	3,513	3,512	523,939	574,531	560,371	540,941
Spain.....	812	1,031	.....	.....	139,671	172,759	.....	.....
Italy.....	868	981	1,038	965	72,837	87,017	96,668	105,517
Germany.....	6,945	7,069	6,900	7,136	1,400,991	1,681,628	1,702,070	2,032,274
Austria.....	453	489	519	538	83,216	96,563	87,032	118,314
Czecho-Slovakia.....	1,727	1,777	1,876	1,906	312,867	336,044	393,217	454,221
Hungary.....	652	711	733	731	72,221	64,821	90,069	95,497
Yugoslavia.....	560	605	648	.....	41,930	53,530	59,818	.....
Rumania.....	495	521	582	.....	75,865	68,085	77,622	.....
Poland.....	6,125	6,742	7,150	7,360	972,152	1,120,238	1,259,609	1,388,889
Lithuania.....	347	423	442	456	53,811	73,428	76,400	92,196
Latvia.....	200	251	296	314	28,477	46,478	59,208	65,476
Finland.....	171	191	215	230	27,496	39,028	48,596	40,162
U. S. S. R. (Russia).....	13,411	14,695	18,723	16,920	1,578,964	1,758,036	.....	.....
Chile.....	93	125	126	.....	13,557	17,696	17,036	.....
Argentina.....	313	338	.....	.....	29,325	34,184	.....	.....
Australia.....	140	141	.....	.....	13,315	13,137	.....	.....

Table 15

POTATOES: Yield per Acre (Bushels)

	1926- 1930 aver- age	1931- 1935 aver- age	1936- 1937	1937- 1938		1926- 1930 aver- age	1931- 1935 aver- age	1936- 1937	1937- 1938
United States.....	114.0	108.0	108.4	123.1	Germany.....	201.7	237.9	246.7	284.8
Canada.....	135.1	138.4	131.2	133.8	Austria.....	183.7	197.5	167.7	219.9
United Kingdom.....	238.1	245.7	237.1	256.7	Czecho-Slovakia.....	181.2	189.1	209.6	238.3
Eire (I. F. S.).....	238.1	266.8	270.6	309.9	Hungary.....	110.8	91.2	122.9	130.6
Norway.....	263.3	268.8	273.6	247.2	Yugoslavia.....	74.9	88.5	92.3	.....
Sweden.....	173.2	208.1	203.3	197.3	Rumania.....	153.3	130.7	133.4	.....
Netherlands.....	273.4	276.6	286.0	273.4	Poland.....	158.7	167.5	176.2	188.7
Belgium.....	305.4	319.8	302.3	289.7	Lithuania.....	155.1	173.6	172.9	202.2
France.....	145.3	164.4	159.5	154.0	Finland.....	160.8	204.3	226.0	213.7
Spain.....	172.0	167.6	.....	.....	U. S. S. R. (Russia).....	117.7	119.6	.....	.....
Italy.....	83.9	88.7	93.1	109.3	Chile.....	145.8	141.6	135.2	.....

¹ Excluding China.



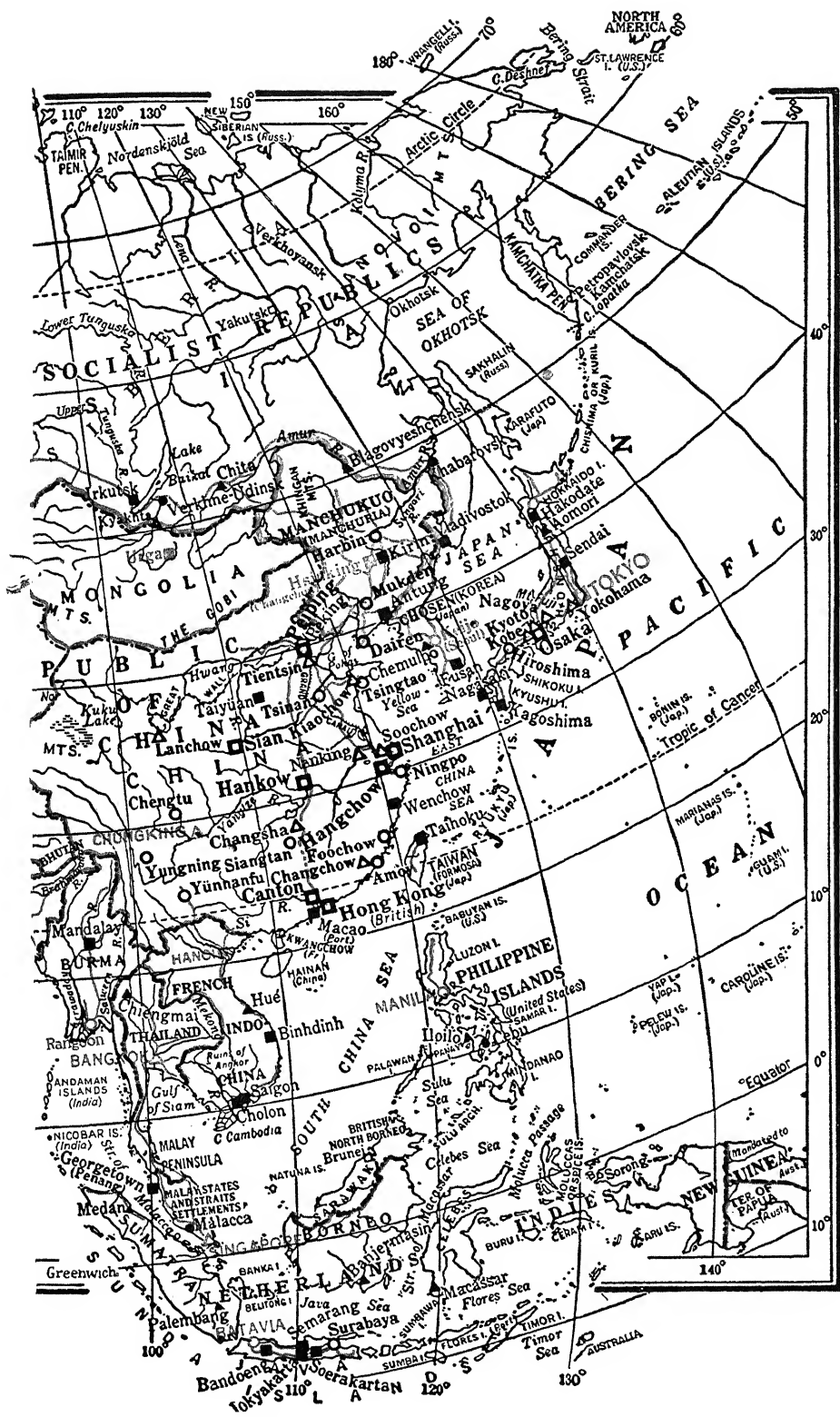


Table 16 SUGAR BEETS: Acreage and Production

	Acreage (1,000 acres)				Production (1,000 short tons)			
	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936	1937	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936	1937
World total.....	6,824	8,068	8,212	8,218	64,805	68,939	79,423	90,304
United States.....	676	801	776	759	7,355	8,944	9,028	8,798
Canada.....	32	42	56	46	265	429	595	433
Great Britain.....	165	322	355	314	1,439	3,215	3,869	3,307
Sweden.....	77	106	127	126	962	1,620	1,984	2,000
Denmark.....	92	95	94	102	1,208	1,336	2,003	2,447
Netherlands.....	157	111	106	103	2,317	1,886	1,806	1,561
Belgium.....	164	133	118	118	2,035	1,824	1,644	1,517
France.....	601	666	769	702	6,367	8,607	9,101	8,438
Spain.....	182	223	217	200	1,908	1,772	.....	.....
Italy.....	226	238	302	317	2,573	2,825	2,928	3,653
Germany.....	1,062	887	961	1,125	11,856	11,642	13,333	17,307
Austria.....	62	107	93	100	686	1,201	1,006	1,078
Czecho-Slovakia.....	677	424	381	448	7,952	5,171	4,623	6,599
Hungary.....	168	128	122	117	1,647	1,134	1,239	1,216
Yugoslavia.....	110	96	64	37	822	700	681	470
Rumania.....	167	81	72	82	1,207	614	471	610
Poland.....	510	327	300	365	4,609	3,147	2,817	3,582
U. S. S. R. (Russia).....	1,020	3,144	3,104	2,943	9,074	11,680	18,552	23,259

Table 17 SUGAR BEETS: Yield per Acre (Short Tons)

	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936	1937		1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936	1937
United States	10.9	11.2	11.6	11.6	Spain	10.5	7.9	..	..
Canada	8.3	10.5	10.6	9.4	Italy	11.4	11.9	9.7	11.5
United Kingdom	9.0	10.0	10.9	10.5	Germany	11.2	13.1	13.9	15.4
Sweden	12.5	15.3	15.6	15.9	Czecho-Slovakia	11.7	12.2	12.1	14.7
Denmark	13.1	14.1	21.3	24.0	Hungary	9.8	8.9	10.2	10.4
Netherlands	14.8	17.0	17.0	15.2	Poland	9.0	9.6	9.4	9.8
Belgium	12.4	13.7	13.9	12.9	U. S. S. R. (Russia)	5.6	3.7	6.0	7.9
France	10.6	12.9	11.8	12.0	Rumania	7.2	7.6	6.5	7.4

Table 18 SUGAR: Production of Raw Beet Sugar
(Thousands of Short Tons)

	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38		1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38
World total.....	9,488	9,979	10,998	12,096	Italy.....	352	397	380	382
United States.....	1,066	1,396	1,395	1,376	Germany.....	1,937	1,838	1,810	2,330
United Kingdom.....	202	498	650	510	Czecho-Slovakia.....	1,301	825	801	818
Sweden.....	144	252	325	358	Hungary.....	219	158	158	132
Denmark.....	166	173	238	254	Poland.....	745	546	505	620
Netherlands.....	306	262	259	248	U. S. S. R. (Russia).....	1,148	1,371	2,203	2,800
Belgium.....	297	274	268	266	Rumania.....	139	112	87	96
France.....	879	1,112	960	1,034	Canada.....	38	66	89	61
Spain.....	242	216	249	226	Japan.....	22	25	53	58
					Australia.....	3	6	5	5

Table 19 SUGAR: Production of Raw Cane Sugar
(Thousands of Short Tons)

	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38		1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38
World total.....	19,684	19,227	23,780	23,905	Europe and Asia...	8,165	9,169	11,879	12,020
North and Central America and West Indies..	7,934	6,114	7,393	7,433	India.....	3,341	4,909	7,523	7,355
United States and possessions.....	1,678	2,124	2,484	2,529	Taiwan.....	681	886	1,088	1,474
United States.....	123	236	437	510	Java.....	2,867	1,731	1,568	1,568
Puerto Rico.....	687	894	996	997	Philippine Islands.....	819	1,170	1,121	1,103
Hawaii.....	861	991	1,042	1,014	South America.....	2,155	2,237	2,359	2,229
Cuba.....	5,221	2,803	3,374	3,360	Argentina.....	440	384	486	414
Dominican Republic...	391	439	500	504	Brazil.....	1,056	1,134	1,100	1,055
					Peru.....	428	441	455	448
					Africa.....	763	928	1,120	1,170
					Oceania.....	668	785	1,030	1,053
					Australia.....	564	667	869	896

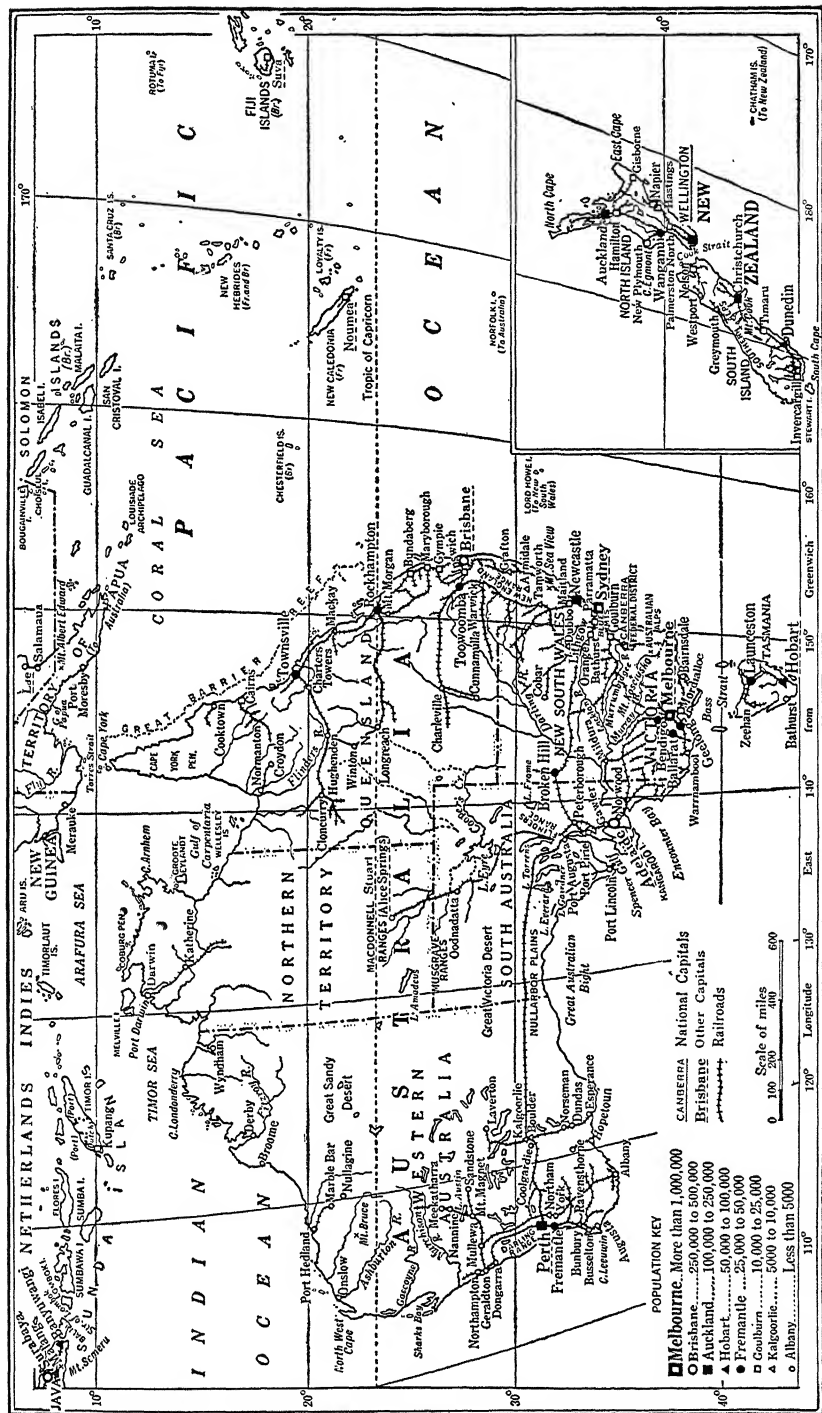
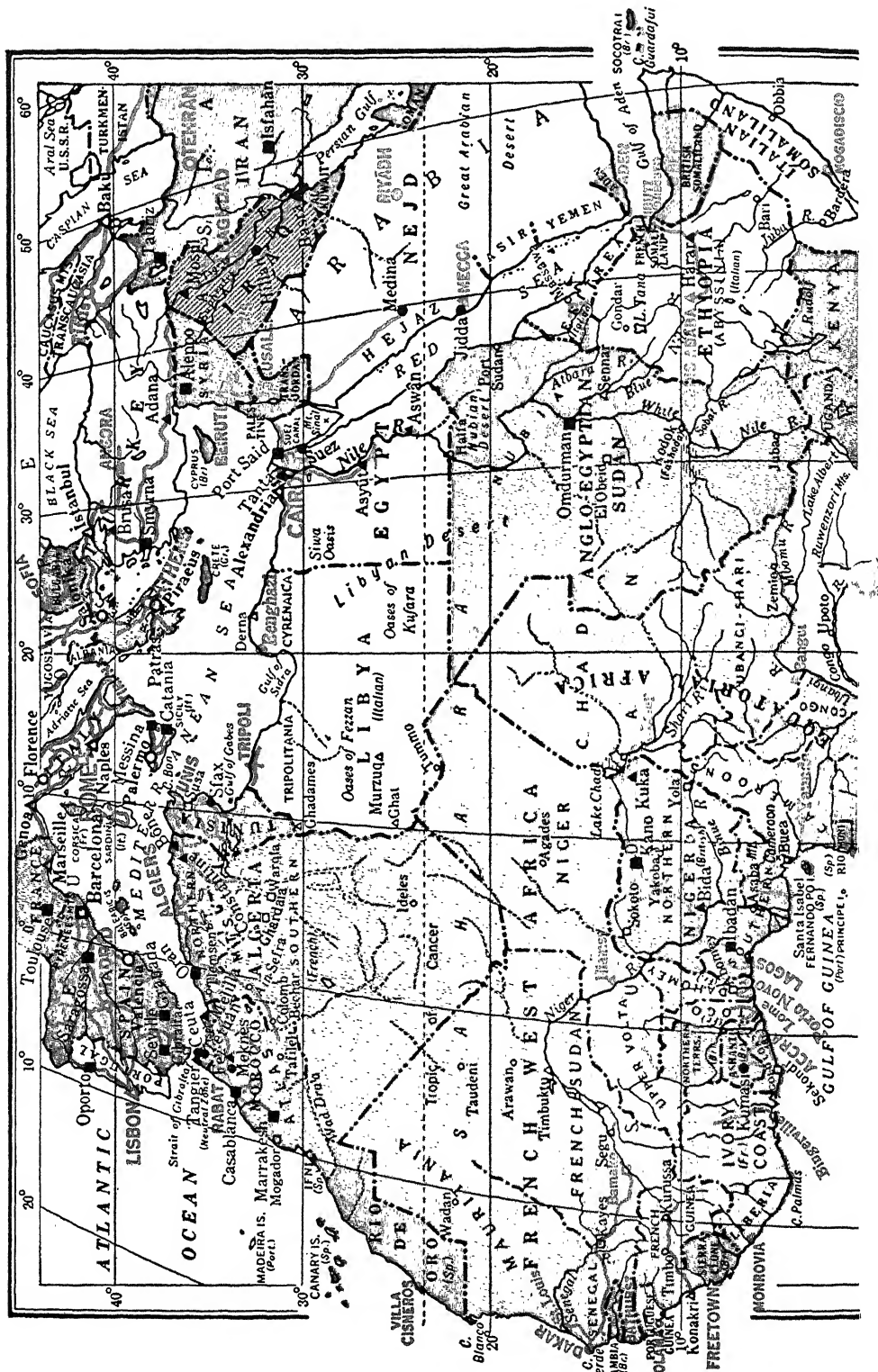
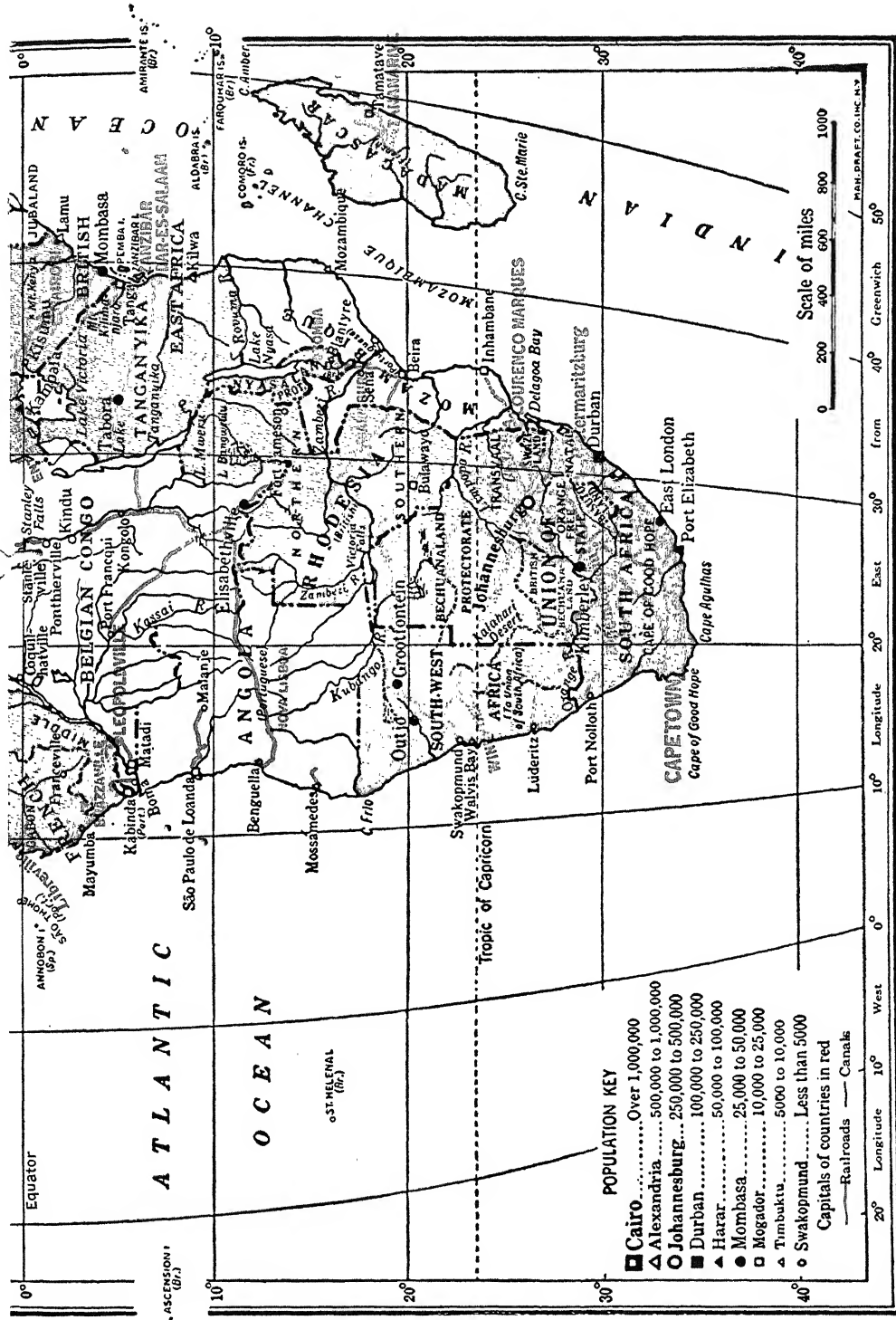


PLATE 8—POLITICAL MAP OF AUSTRALIA





Calligraphy

Table 20 SUGAR: World Production of Raw Cane and Beet Sugar
(Thousands of Short Tons of 2,000 Pounds)

	Estimated world total	Estimated world total, cane	Estimated world total, beet	Selected countries							
				United States	Cuba	India	Java	Germany	Czecho-Slovakia	Poland	France
1909-10.....	16,828	9,670	7,158	883	2,021	2,481	1,411	2,147	....	...	861
1910-11.....	18,834	9,870	8,964	903	1,661	2,587	1,617	2,770	....	...	763
1911-12.....	17,908	10,622	7,286	1,005	2,124	2,745	1,550	1,552	....	...	546
1912-13.....	20,542	10,896	9,646	907	2,720	2,862	1,616	2,002	....	...	1,029
1913-14.....	21,154	11,640	9,514	1,089	2,909	2,573	1,549	2,886	....	...	841
1914-15.....	20,875	11,952	8,923	1,023	2,922	2,736	1,454	2,721	....	376	355
1915-16.....	18,885	12,278	6,607	1,078	3,398	2,949	1,797	1,678	....	239	159
1916-17.....	18,592	13,255	5,337	1,193	3,422	3,093	2,009	1,721	....	293	217
1917-18.....	20,293	14,790	5,503	1,068	3,890	3,839	1,960	1,726	....	263	235
1918-19.....	18,604	14,076	4,528	1,102	4,491	2,752	1,473	1,297	714	249	129
1919-20.....	17,989	14,338	3,651	902	4,184	3,404	1,681	774	553	106	182
1920-21.....	19,546	14,225	5,321	1,345	4,406	2,825	1,853	1,195	797	195	358
1921-22.....	20,833	15,311	5,522	1,425	4,517	2,928	1,994	1,434	731	200	326
1922-23.....	20,879	15,130	5,749	1,024	4,083	3,410	1,981	1,604	811	335	522
1923-24.....	22,987	16,478	6,509	1,111	4,606	3,715	2,201	1,263	1,115	423	524
1924-25.....	26,926	18,011	8,909	1,256	5,812	2,852	2,535	1,724	1,574	540	880
1925-26.....	27,750	18,717	9,033	1,119	5,524	3,334	2,140	1,763	1,662	638	796
1926-27.....	27,163	18,779	8,384	1,008	5,050	3,659	2,592	1,834	1,153	634	763
1927-28.....	29,249	19,511	9,738	1,242	4,527	3,603	3,223	1,846	1,383	624	911
1928-29.....	30,865	20,633	10,232	1,271	5,775	3,028	3,105	2,054	1,165	832	957
1929-30.....	30,813	20,784	10,029	1,307	5,231	3,082	3,214	2,188	1,142	1,010	968
1930-31.....	31,575	19,343	12,232	1,508	3,495	3,615	3,056	2,808	1,258	855	1,271
1931-32.....	29,246	20,058	9,188	1,421	2,917	4,452	2,822	1,760	903	544	923
1932-33.....	27,145	18,759	8,386	1,717	2,234	5,237	1,513	1,202	695	461	1,079
1933-34.....	28,788	19,184	9,604	2,007	2,527	5,484	701	1,574	569	380	999
1934-35.....	29,255	18,769	10,486	1,508	2,842	5,757	562	1,844	708	492	1,291
1935-36.....	31,606	20,919	10,687	1,651	2,899	6,611	603	1,845	631	490	977
1936-37.....	34,778	23,780	10,998	1,832	3,374	7,523	1,568	1,810	801	505	960
1937-38.....	36,000	23,904	12,096	1,886	3,360	7,355	1,568	2,330	818	620	1,034

Table 21 SUGAR: World Trade (Short Tons of 2,000 Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters:								
Cuba.....	5,032,658	525	2,911,526	23	2,680,798	53	.....	.....
Netherland India.....	2,380,762	3,634	1,672,683	2,582	1,138,706	1,612	974,489	18
Czecho-Slovakia.....	792,566	628	381,607	720	216,294	8	211,185	9
Philippine Islands.....	612,260	2,398	1,046,077	803	569,043	174	991,892	187
Dominican Republic.....	353,915	196	383,422	4	549,132	3	479,288	5
Peru.....	332,668	106	369,999	195	358,724	357	358,851	453
Poland.....	253,202	2,291	251,286	5,706	118,360	15	68,167	34
Mauritius.....	242,199	3	214,838	43	257,059	0	307,776	0
Australia.....	179,533	911	333,787	4,274	306,142	88	.....	.....
Germany.....	174,357	92,758	165,659	19,224	8,672	19,038	19,695	11,362
Belgium.....	152,164	77,890	95,714	93,160	118,085	106,748	134,253	152,125
British Guiana.....	113,607	417	140,662	80	195,049	42	197,683	60
U. S. S. R. (Russia).....	105,024	57,858	128,940	81,635	84,294	280	179,507	342
Union of South Africa.....	82,951	10,307	172,725	3,604	223,459	1,139	152,083	1,334
Principal importers:								
United States.....	167,360	4,428,566	73,260	3,102,806	113,956	2,954,988	61,716	2,969,297
United Kingdom.....	105,263	2,135,293	309,079	2,266,067	374,181	2,198,681	394,878	2,532,159
British India.....	40,084	904,568	40,259	555,898	36,331	251,596	36,950	42,090
China.....	2,072	823,225	182	495,504	12	287,357	30	175,049
Canada.....	89,914	524,446	9,250	441,572	2,790	450,377	6,012	520,511
France.....	251,691	460,753	309,839	435,730	286,321	403,361	244,341	345,790
Japan.....	204,103	414,134	162,154	158,690	182,839	154,889	209,660	238,109
Netherlands.....	284,204	316,951	62,874	142,193	57,668	128,586	53,675	162,695
Switzerland.....	74	148,736	893	177,673	1,193	166,707	1,075	149,735
British Malaya.....	31,068	125,180	14,954	112,806	18,164	129,739	19,020	143,968
Morocco.....	0	121,576	469	155,696	8,656	169,261	8,635	185,698

Table 22 COFFEE: World Trade (Thousands of Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total.....	3,086,405	3,006,773	3,361,270	3,269,082	3,511,625	3,424,778	2,737,987	3,344,561
Principal exporters:								
Brazil.....	1,865,392	0	1,975,720	0	2,027,631	0	1,876,432	0
Colombia.....	324,155	6	418,078	3	498,526	0	512,900	0
Netherland India.....	187,523	3,035	175,039	2,485	179,612	1,731	67,007	30
Venezuela.....	118,217	0	120,925	5	118,273	24	.....	.....
Guatemala.....	100,953	0	98,394	0	90,151	0	.....	0
El Salvador.....	96,466	0	114,182	11	110,384	0	.....	0
Principal importers:								
United States.....	17,699	1,429,825	7,375	1,590,445	7,654	1,755,809	9,046	1,739,191
France.....	219	360,039	117	411,227	34	415,086	69	411,281
Germany.....	365	266,650	1,052	318,355	185	325,554	132	342,616
Netherlands.....	36,978	113,722	17,286	104,385	9,615	81,625	3,039	71,459
Italy.....	4	99,761	40	91,970	15	89,301	50	69,946
Sweden.....	25	90,654	113	100,096	17	106,853	22	102,954
Belgium.....	890	88,285	3,139	109,317	308	107,986	1,224	115,508

Table 23 TOBACCO: Acreage and Production

	Acreage (thousands of acres)					Production (millions of pounds)				
	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1935-36	1936-37	1937-38	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1935-36	1936-37	1937-38
World total.....	5,597	5,688	5,535	.....	.....	4,867	4,864	5,103	.....	.....
United States.....	1,757	1,706	1,437	1,438	1,732	1,357	1,337	1,297	1,155	1,553
Canada.....	37	48	47	55	65	35	45	54	46	71
Mexico.....	41	33	36	.....	.....	24	24	27	.....	.....
Cuba.....	150	120	115	109	122	61	56	42	42	56
Dominican Republic.....	40	.....	.....	.....	.....	35	16	9	.....	.....
Puerto Rico.....	51	29	44	45	.....	33	22	26	27	.....
Argentina.....	23	37	39	.....	.....	26	32	34	.....	.....
Brazil.....	221	.....	.....	.....	.....	182	216	213	.....	.....
Paraguay.....	22	23	.....	.....	.....	24	31	.....	.....	.....
France.....	39	41	45	.....	.....	61	71	83	.....	.....
Hungary.....	52	53	38	37	35	58	67	47	50	47
Germany.....	21	27	31	32	32	44	60	75	73	68
U. S. S. R. (Russia).....	214	459	487	501	491	346	341	534	608	493
Italy.....	96	97	82	80	80	91	106	102	97	95
Bulgaria.....	83	67	85	92	101	61	54	62	67	69
Greece.....	221	195	198	273	226	138	104	102	170	141
Rumania.....	79	40	44	45	35	43	24	29	33	29
Yugoslavia.....	33	37	30	44	51	23	26	20	37	55
Poland.....	8	12	13	15	18	10	16	25	24	29
Czecho-Slovakia.....	14	23	25	24	23	16	29	30	33	33
Turkey.....	156	124	133	148	185	115	85	79	99	139
India.....	1,281	1,285	1,357	.....	.....	1,367	1,370	1,458	.....	.....
China.....	.....	1,299	1,353	1,345	.....	.....	1,358	1,393	1,404	.....
Java and Madura.....	49	73	58	64	.....	63	58	50	51	.....
Sumatra.....	49	39	28	31	.....	43	34	28	30	.....
Philippine Islands.....	194	179	153	.....	.....	102	92	63	.....	.....
Japan.....	91	86	86	87	85	142	145	142	133	142
Chosen.....	46	35	40	43	46	42	37	48	45	56
Algeria.....	65	54	57	55	53	54	40	42	39	.....

Table 24 TOBACCO: Yield per Acre (Pounds)

	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38		1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38
United States.....	772	783	803	897	Greece.....	623	530	654	622
Canada.....	942	947	838	1,092	Rumania.....	551	603	735	817
Puerto Rico.....	647	742	600	.....	Turkey.....	734	683	670	751
France.....	1,574	1,720	.....	.....	Java and Madura.....	524	515	.....	.....
Hungary.....	1,115	1,259	1,360	1,336	Philippine Islands.....	524	515	.....	.....
U. S. S. R. (Russia).....	1,618	742	1,215	1,004	Japan (proper).....	1,563	1,885	1,533	1,675
Italy.....	952	1,097	1,210	.....	China.....	.....	1,046	1,044	.....
Bulgaria.....	734	793	725	684	India.....	1,048	1,066	.....	.....

Table 25 TOBACCO: World Trade (Thousands of Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporters:								
United States.....	525,232	78,243	479,027	63,588	396,330	63,296	425,269	67,519
Netherland India.....	170,071	11,967	143,887	8,204	108,486	1,444	81,269	1,588
Greece.....	109,224	40	88,048	50	111,178	55	88,083	.....
Turkey.....	78,023	0	57,537	114	51,357	313	54,451	.....
Brazil.....	67,864	3,869	67,101	2,101	72,670	.....	69,405	.....
Bulgaria.....	57,616	0	48,886	0	53,546	.....	44,116	.....
Philippine Islands.....	47,940	674	44,917	1,604	52,679	447	31,840	668
Cuba.....	42,279	0	38,551	0	31,339	0	.....	0
British India.....	40,432	16,192	35,810	12,121	36,375	12,350	38,155	11,355
Principal importers:								
Germany.....	679	217,778	888	191,864	73	201,201	0	200,162
United Kingdom.....	6,211	202,589	8,976	198,485	7,066	240,364	5,479	260,395
China.....	24,737	104,548	20,276	93,744	29,915	26,371	37,921	38,243
France.....	403	92,321	1,387	104,127	412	71,990	685	66,090
Netherlands.....	3,115	70,090	4,044	71,061	3,562	61,095	2,158	62,209
Spain.....	37	53,821	0	62,733	0	61,083	.....	.....
Belgium.....	82	45,005	436	47,198	360	44,490	212	43,598
Czecho-Slovakia.....	7	38,996	0	21,474	0	25,251	0	20,472

Table 26 COTTON: Acreage and Production

	Acreage (thousands of acres)					Production (thousands of bales of 478 pounds net)				
	1921-22 to 1925-26 average	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38	1921-22 to 1925-26 average	1925-26 to 1929-30 average	1930-31 to 1934-35 average	1936-37	1937-38
World total.....	73,500	84,580	79,628	85,700	92,190	21,500	27,158	25,820	30,900	38,159
United States.....	37,616	42,601	34,658	30,028	33,930	11,516	15,268	13,943	12,399	18,746
Mexico.....	330	472	349	844	856	187	253	195	359	326
Peru.....	282	305	328	445	.....	203	246	274	374	.....
Brazil.....	1,475	1,492	2,437	6,425	.....	568	504	772	1,749	2,205
Argentina.....	156	241	436	713	1,035	61	115	191	144	.....
Egypt.....	1,768	1,828	1,743	1,781	2,053	1,361	1,587	1,482	1,887	2,282
A.-E. Sudan.....	134	270	349	475	443	46	126	159	268	.....
Belgian Congo.....	.....	253	452	.....	.....	.....	26	71	141	.....
Uganda.....	420	615	991	1,487	1,437	107	131	206	269	314
U. S. S. R. (Russia).....	741	2,017	4,883	5,023	.....	306	1,022	1,775	3,250	3,482
Iran.....	.....	.....	206	.....	.....	.....	95	110	157	.....
India.....	23,818	26,192	23,025	25,219	25,583	4,523	4,724	4,729	5,278	4,867
China.....	4,498	5,563	6,451	8,447	9,300	2,021	2,552	2,730	3,870	3,600

Table 27 COTTON: World Trade (Thousands of Bales)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total.....	14,210	19,155	12,574	12,796	11,888	11,759	12,128	13,224
Principal exporters:								
United States.....	8,805	393	7,672	169	6,169	105	5,652	177
British India.....	3,023	169	2,492	288	2,631	408	3,336	253
Egypt.....	1,480	0	1,510	0	1,773	0	1,618	0
Brazil.....	109	0	175	1	639	0	924	0
Argentina.....	78	1	119	0	168	0	227	0
Principal importers:								
United Kingdom.....	0	3,208	0	2,487	0	2,505	0	3,109
Japan.....	0	3,108	0	3,289	0	3,392	0	4,200
Germany.....	304	1,819	309	1,668	190	1,430	34	1,092
France.....	105	1,638	34	1,320	30	1,032	19	1,491
Italy.....	1	1,072	1	897	0	686	0	466
China.....	289	1,636	187	878	145	253	170	188
Czecho-Slovakia.....	1	566	1	392	0	350	1	421
Belgium.....	12	391	72	368	142	445	144	506
Poland.....	0	290	0	261	0	303	0	326
Canada.....	0	277	0	233	0	252	0	313
Netherlands.....	2	187	1	194	1	188	3	229
Austria.....	1	154	0	114	0	160	0	181

Table 28 COTTON: Consumption, Years Ended July 31

	Bales consumed (thousands)					Percent of total	
	1913	1921-25 average	1926-30 average	1936	1937	1926-30 average	1937
World total.....	21,963	20,166	25,149	27,627	30,820	100.0	100.0
United States (lint only).....	5,483	5,869	6,735	6,351	7,950	26.8	25.8
United Kingdom.....	4,644	2,810	3,054	2,846	3,020	12.1	9.8
Continental Europe.....	7,514	5,362	7,668	8,041	8,539	30.5	27.7
India.....	1,843	1,800	1,840	2,550	2,560	7.3	8.3
Japan.....	1,435	2,179	2,733	3,602	3,960	10.9	12.8
China.....		1,181	2,004	2,488	2,690	8.0	8.7
Canada.....	131	181	239	263	305	1.0	1.0

Table 29 RAYON: Production (Metric Tons of 2,204.6 Pounds)

	1930	1935	1936	1937	1938		1930	1935	1936	1937	1938
United States.....	57,758	116,827	125,931	141,632		Belgium.....	5,750	6,225	6,450	7,711	
Italy.....	30,139	38,988	38,000	47,310		Switzerland.....	4,592	3,687	5,000		
Germany.....	26,772	46,406	50,800	49,896		Poland.....	2,727	5,119	5,129	6,260	
France.....	22,950	23,950	19,300	21,772		Czecho-Slovakia.....	2,303	2,785	3,377		
United Kingdom.....	22,668	50,775	51,174	54,296		Canada.....	1,796	6,010	6,153	7,110	
Japan.....	16,311	99,212	130,000	149,687		Spain.....	1,523	2,722	700		
Netherlands.....	8,000	9,400	9,500	10,297		U. S. S. R. (Russia).....	600	5,600	5,600		

Table 30 WOOL: Production (Millions of Pounds)

	1926-30 average	1931-35 average	1936	1937		1926-30 average	1931-35 average	1936	1937
World total.....	3,593	3,540	3,614		U. S. S. R. (Russia).....	363	159	200	259
United States.....	364	432	427	433	Spain.....	74	69	71	...
Canada.....	20	20	19	19	United Kingdom.....	112	114	108	106
Argentina.....	327	361	373	375	Yugoslavia.....	28	31	33	35
Uruguay.....	140	111	116	123	Union of S. Africa.....	294	270	264	230
France.....	47	37	37	38	Algeria.....	42	38	48	49
Germany.....	35	30	35	38	Turkey.....	31	30	42	49
Italy.....	53	41	36	37	China.....	78	78	78	78
Rumania.....	67	64	60		Australia.....	926	1,011	975	1,014
					New Zealand.....	258	281	303	314

Table 31 WOOL: World Trade (Thousands of Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total.....	2,073,339	2,339,500	2,142,485	2,400,227	2,281,955	2,505,240	2,354,906	2,337,218
Principal exporters:								
Australia.....	739,123	3,990	831,595	3,108	919,076	5,401	797,514	9,370
Argentina.....	294,973	302	298,497	97	300,842	85	307,762	108
Union of South Africa.....	254,431	576	277,504	866	270,420	3,050	220,285	2,665
New Zealand.....	220,228	103	237,843	15	222,656	155	314,408	119
Uruguay.....	117,856	0	114,502	11	111,080	0	101,432	0
China.....	58,272	568	28,737	763	50,327	1,457	41,359	1,185
British India.....	50,373	27,843	38,276	15,637	49,885	22,775	46,479	27,330
Chile.....	26,196	435	23,536	149	22,001	526	20,970	1,281
Algeria.....	24,047	3,632	11,616	1,903	9,681	1,932	18,283	2,611
Principal importers:								
France.....	53,286	633,028	50,173	588,871	49,821	502,267	69,223	465,510
United Kingdom.....	54,037	473,061	45,112	576,471	56,143	595,634	46,560	662,465
Germany.....	24,109	361,447	18,545	335,535	3,619	287,163	945	247,093
United States.....	322	288,346	151	133,397	20	202,733	16	257,725
Belgium.....	19,091	135,887	72,853	164,322	117,155	235,327	247,458	106,214
Italy.....	7,188	99,134	4,959	144,051	884	115,985	1,117	42,312
Japan.....	0	93,489	0	186,681	0	245,245	0	219,584
U. S. S. R. (Russia).....	4,024	46,095	20	62,649	0	70,395	.....	57,082

Table 32 SILK: Commercial Production of Raw Silk (Pounds)

	1909-13 average	1921-25 average	1930-34 average	1936	1937
Total countries specified.....	56,389,000	75,501,000	121,040,000	.....
Italy.....	8,524,000	9,487,000	8,144,000	6,200,000	
France.....	992,000	548,000	199,000	.....
Spain.....	182,000	177,000	98,000	.....
Levant and Central Asia ¹	6,611,000	1,874,000	4,766,000	.....
China (exports).....	17,722,000	16,874,000	12,342,000	9,788,000	
Japan (exports).....	21,898,000	46,336,000	94,980,000	99,427,000	
India (exports).....	428,000	121,000	136,000	238,000	
Indo-China (exports).....	32,000	84,000	375,000	375,000	
United States (imports).....	23,488,000	52,119,000	74,427,000	66,889,000	

Table 33 RUBBER: World Exports (Long Tons of 2,240 Pounds)

Year	World	Middle eastern plantation		American			Africa
		British ²	Other ³	Brazil	Other	Mexican guayule	
1911.....	94,055	14,979	2,522	35,970	15,129	7,172	18,283
1912.....	114,276	28,722	4,584	41,619	14,241	6,192	18,918
1913.....	120,123	46,391	7,253	35,659	12,856	1,969	15,986
1914.....	123,173	64,259	10,328	33,001	7,601	265	7,719
1915.....	170,826	96,266	20,104	34,610	10,322	1,386	8,138
1916-20, average.....	290,735	185,000	58,690	28,541	9,190	1,035	8,280
1921-25, average.....	414,205	244,832	139,159	20,387	3,451	1,333	5,043
1926-30, average.....	716,639	437,197	246,369	21,923	1,691	2,954	6,505
1931.....	805,869	517,966	272,498	12,121	222	.....	3,072
1932.....	707,500	470,690	228,600	6,420	39	.....	1,751
1933.....	850,820	533,400	304,800	9,883	639	.....	2,098
1934.....	1,016,210	586,346	417,976	8,903	34	398	2,553
1935.....	872,722	513,639	339,862	11,275	2,462	459	5,025
1936.....	855,278	448,000	387,000	14,763			5,905

Table 34 RUBBER: Net Imports of Principal Countries
(Long Tons of 2,240 Pounds)

	1910-15, average	1926-30, average	1933	1934	1935	1936	1937
United States.....	50,885	439,190	393,728	439,172	467,146	488,145	
United Kingdom.....	19,952	78,541	44,086	158,482	126,764	73,214	
France.....	4,970	46,571	40,948	49,560	51,450	62,053	
Germany.....	14,783	38,818	45,019	59,330	62,899	71,793	
Canada.....	1,708	28,167	19,941	28,439	26,882	27,867	
Japan.....	940	26,154	56,028	69,905	58,178	61,700	
Italy.....	2,543	13,854	15,289	21,398	26,053	16,535	
U. S. S. R.....	9,457	12,626	30,047	47,271	37,607	30,994	
Australia.....	627	9,588	12,576	9,642	9,978	.....
Belgium.....	2,374	7,426	9,519	9,115	7,599	9,626	
Czecho-Slovakia.....	.....	3,357	9,463	10,999	11,226	8,781	
Sweden.....	897	2,934	4,256	7,366	4,838	4,538	
Austria.....	1,804	2,735	1,954	3,417	3,650	3,571	
Netherlands.....	1,774	2,299	2,851	3,758	4,069	2,890	
Spain.....	552	1,997	4,342	6,900	8,553	.....

¹ Includes Hungary, Czecho-Slovakia, Rumania, Bulgaria, Greece, European Turkey, Crete, The Caucasus, Turkistan, Central Asia, and Iran.

² Including British Malaya, Ceylon, India, British North Borneo, Sarawak, Brunei, and Fiji Islands.

³ Including Netherland India, Siam, French Indo-China, and Philippine Islands.

Table 35 **LIVESTOCK: Number of Cattle, Hogs, and Sheep**
in Principal Countries (in Thousands)

	Cattle			Hogs			Sheep		
	1921- 1925 aver- age	1926- 1930 aver- age	Latest avail- able year	1921- 1925 aver- age	1926- 1930 aver- age	Latest avail- able year	1921- 1925 aver- age	1926- 1930 aver- age	Latest avail- able year
Total (estimated)	648,300	684,300	759,669	256,300	284,800	284,540	644,400	742,300	683,878
North America:									
United States	66,725	59,191	65,930	62,088	56,844	44,418	37,662	45,560	52,918
Canada	9,588	8,860	8,820	4,344	4,387	4,139	3,027	3,431	3,370
Mexico	2,492	7,834	10,083	1,125	3,300	6,544	1,362	3,186	3,674
Cuba	4,841	4,496	4,651	591	591	952	.....	102	42
South America:									
Colombia	7,468	6,857	8,337	1,352	1,400	1,622	776	794	872
Venezuela	2,689	3,000	2,750	512	512	500	113	113	125
Ecuador	1,500	1,282	1,280	150	153	150	1,000	1,100	700
Peru	1,198	1,806	2,310	429	689	933	11,363	11,209	.....
Bolivia	2,145	1,918	2,064	362	375	398	3,436	4,742	5,232
Chile	1,957	2,153	2,570	255	331	331	4,332	6,263	6,263
Brazil	34,271	47,000	40,864	16,169	22,000	24,774	7,933	10,700	13,049
Uruguay	8,432	7,128	8,000	278	308	300	14,443	19,958	20,000
Paraguay	4,600	4,500	3,750	.....	45	29	600	.....	142
Argentina	37,065	32,000	33,101	1,437	3,769	3,769	36,209	44,413	43,790
Europe:									
United Kingdom	7,782	7,985	8,622	2,963	2,879	4,561	22,233	24,675	25,040
Irish Free State	4,266	4,059	4,014	947	1,048	1,017	2,804	3,255	3,062
Norway (rural only)	1,128	1,221	1,348	216	303	410	1,380	1,596	1,749
Sweden	2,418	2,980	2,919	1,056	1,574	1,293	1,384	680	444
Denmark	2,613	2,981	3,167	2,314	3,741	3,572	380	213	179
Netherlands	2,063	2,366	2,570	1,519	2,018	1,679	668	485	655
Belgium	1,550	1,719	1,783	1,081	1,159	1,054	126	122	.....
France	13,582	14,886	15,762	5,302	5,942	7,089	9,777	10,574	9,788
Spain	3,457	3,714	4,215	4,500	5,024	5,141	19,229	19,989	17,326
Portugal	754	853	778	1,019	1,163	1,139	3,721	4,450	3,224
Italy	6,812	7,108	7,245	2,630	3,086	3,206	12,014	11,310	8,882
Switzerland	1,425	1,598	1,567	640	782	875	245	170	175
Germany	16,786	17,776	20,088	15,776	19,715	25,892	5,889	3,953	3,923
Austria	2,241	2,313	2,349	1,399	1,965	2,823	526	272	263
Czecho-Slovakia	4,337	4,693	4,596	2,201	2,814	3,242	986	848	592
Hungary	1,866	1,814	1,742	2,424	2,503	2,554	1,661	1,604	1,350
Yugoslavia	4,122	3,749	3,982	2,875	2,743	2,932	7,683	7,307	9,211
Greece .....	.....	926	1,016	.....	422	624	.....	6,799	8,185
Bulgaria	1,928	2,266	2,183	832	1,002	916	8,186	8,384	8,349
Rumania	5,570	4,820	4,326	2,976	2,915	2,969	11,660	12,936	11,282
Poland	8,063	9,019	10,569	5,287	5,736	7,053	2,193	2,244	3,020
Lithuania	1,149	1,245	1,185	1,521	1,189	1,190	1,314	1,335	656
Latvia	867	977	1,261	465	499	674	1,240	1,030	1,352
Estonia	508	623	676	299	317	281	654	587	552
Finland	1,847	1,841	1,882	378	404	510	1,526	1,196	1,024
U. S. S. R. (Russia)	58,263	64,900	46,500	21,184	21,040	20,400	98,100	122,780	53,500
Africa:									
Morocco, French	1,711	1,971	2,055	.....	117	90	7,533	8,364	9,284
Algeria	853	903	840	.....	87	56	5,943	6,170	6,416
French West Africa	3,251	2,536	2,536	.....	210	209	5,915	4,563	5,556
Nigeria and Br. Cameroons	2,919	3,117	2,763	.....	27	49	1,711	3,004	1,947
Egypt	1,310	1,551	1,852	.....	11	14	1,013	1,138	1,430
Kenya	3,038	3,812	5,208	.....	15	15	2,600	2,908	3,237
Uganda	1,109	1,605	2,186	.....	470	1	356	831	1,051
Union of South Africa	9,459	10,640	11,081	888	888	523	32,561	43,129	39,866
Rhodesia	2,083	2,683	3,066	.....	101	130	333	373	352
Tanganyika Territory	3,806	4,823	4,793	.....	3	8	3,893	2,032	14,478
Madagascar	7,708	7,191	5,693	369	415	504	110	131	204
Asia:									
China .....	.....	.....	23,000	.....	.....	81,000	.....	.....	26,000
Turkey	4,821	5,464	6,100	.....	.....	.....	10,458	11,853	14,800
India, British	146,759	151,847	165,760	.....	.....	.....	22,412	23,733	24,044
India, Native States	33,982	38,532	49,629	.....	.....	.....	12,299	16,330	18,568
Japan	1,440	1,474	1,684	590	688	1,063	.....	24	47
Chosen	1,567	1,586	1,671	1,078	1,244	1,584	.....	.....	.....
Siam	6,701	8,783	10,635	864	864	.....	.....	.....	.....
Philippine Islands	2,393	2,909	3,616	5,768	2,236	2,966	260	125	127
Java and Madura	5,287	5,708	6,066	.....	.....	995	915	1,292	1,588
Oceania:									
Australia	13,789	11,873	13,492	918	985	1,294	85,556	103,329	110,243
New Zealand	3,393	3,439	4,254	336	525	808	23,382	27,516	31,211

Table 36 BEEF AND BEEF PRODUCTS: World Trade
(Thousands of Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total.....	3,054,704	3,007,402	2,193,083	2,207,810	2,049,074	2,173,664	1,834,419	2,084,382
Principal exporters:								
Argentina.....	1,552,601	93	1,058,746	57	1,004,426	40	982,921	35
Uruguay.....	334,616	0	255,162	2	255,843	0	178,482	0
Australia.....	284,476	1,711	231,881	1,653	306,163	722	248,664	736
Netherlands.....	237,540	150,721	91,431	90,083	24,782	44,130	27,691	36,403
United States.....	144,303	84,233	98,860	53,524	51,873	343,633	52,345	164,819
New Zealand.....	115,286	626	131,293	451	148,366	412	154,029	461
Brazil.....	109,765	7,221	130,415	2,088	53,001	.....	21,292	.....
Principal importers:								
United Kingdom.....	34,345	1,795,364	28,466	1,575,517	69,871	1,495,624	49,227	1,506,829
Germany.....	4,267	386,911	7,275	97,386	20	37,854	21	119,283
France.....	35,518	146,920	29,109	82,915	41,984	27,181	22,287	24,037
Belgium.....	38,559	122,183	9,745	68,510	3,014	24,197	3,934	19,405
Japan.....	0	68,201	0	59,129	0	38,774	0	45,887

Table 37 PORK AND PORK PRODUCTS: World Trade
(Thousands of Pounds)

	1925-29 average		1930-34 average		1935		1936	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
World total.....	2,331,267	2,336,415	2,148,833	2,162,811	1,425,974	1,439,931	1,469,904	1,467,976
Principal exporters:								
United States.....	1,136,856	10,459	742,920	3,795	191,746	10,531	187,046	41,846
Denmark.....	557,264	2,869	755,835	1,534	473,345	112	420,893	0
Netherlands.....	249,396	15,089	214,742	3,554	112,300	5,500	92,969	4,396
Eire (Irish Free State).....	92,656	55,011	69,620	26,473	80,695	88	84,532	0
Canada.....	90,757	17,247	60,153	8,614	146,208	485	203,777	2,940
Poland.....	48,032	37,238	109,121	6,318	78,190	46	109,348	39
Sweden.....	41,205	9,796	54,649	4,908	30,618	8,861	30,043	7,092
Principal importers:								
United Kingdom.....	5,883	1,371,607	4,362	1,579,594	3,153	1,169,678	7,021	1,151,079
Germany.....	4,584	322,127	5,969	242,038	194	144,816	81	184,498
Cuba.....	0	130,315	0	50,440	0	33,101	0	.....
France.....	3,135	88,097	1,193	45,249	13,735	5,834	2,328	6,862
Czecho-Slovakia.....	3,665	79,769	1,096	45,846	279	21,464	219	37,245
Mexico.....	12	58,269	1	47,419	.....	529	.....	.....

Table 38 COAL RESERVES OF THE WORLD

	Millions of metric tons		Millions of metric tons
World total.....	7,863,556	Europe (continued):	
North America.....	4,871,000	Belgium.....	11,000
United States and Alaska.....	3,536,000	Norway and Svalbard.....	8,750
(16,000,000,000 of which is anthracite)		Spain.....	5,500
Canada.....	1,361,000	Holland.....	5,000
(2,000,000,000 of which is anthracite)		Russia in Europe.....	12,000
Mexico and Central America.....	10,000	Old Austria and Hungary.....	1,000
South America.....	130,000	Asia.....	1,900,000
Colombia.....	30,000	China.....	1,100,000
Brazil, Chile, Peru, and Venezuela.....	100,000	(427,000,000,000 of which is anthracite)	
Europe.....	522,200	Russia in Asia.....	192,000
British Isles.....	166,000	India.....	87,000
Germany.....	148,200	Indo-China.....	22,000
Poland.....	68,800	Japan.....	9,000
Ukraine.....	55,600	Australasia.....	200,000
Czecho-Slovakia.....	24,500	(183,000,000,000 of which is in the Commonwealth of Australia)	
France.....	18,600	Union of South Africa.....	62,000

Total coal mined in world (metric tons of 2,204.6 lbs.) 1936—1,446,000,000; 1937—1,515,000,000

COAL AND LIGNITE: Production (Thousands of Metric Tons of 2,204.6 Pounds)

Table 39	1913	1921-25 average	1926-30 average	1934	1935	1936	1937
World total.....	1,342,000	1,290,000	1,456,000	1,284,000	1,329,000	1,446,000	1,515,000
United States.....	517,057	507,065	540,223	577,873	585,126	443,293	447,575
Anthracite.....		70,440	69,507	51,862	47,817	49,513	46,189
Bituminous and lignite.....	517,057	436,625	470,716	326,011	337,809	393,780	401,386
Europe:							
Austria—							
Coal.....	16,460	156	192	251	260	244	230
Lignite.....	27,378	2,824	3,175	2,851	2,971	2,897	3,242
Belgium.....	22,842	22,463	26,949	26,389	26,506	27,876	29,681
Czecho-Slovakia—							
Coal.....		12,515	14,742	10,789	10,894	12,233	16,951
Lignite.....		19,168	20,069	15,071	15,114	15,949	18,042
France.....	40,844	38,500	53,549	48,657	47,120	46,146	45,334
Germany—							
Coal.....	190,109	115,985	151,179	124,910	132,379	146,707	171,140
Lignite.....	87,233	128,678	155,142	135,995	146,033	160,276	184,681
Saar Territory.....		11,406	13,439	11,818	10,624	11,673	13,371
U. S. S. R. (Russia).....	35,976	13,143	36,679	66,399	72,813	53,055	79,400
United Kingdom.....	292,044	243,662	226,939	224,269	225,816	232,115	236,935
Asia and Oceania:							
British India.....	16,468	20,331	22,932	22,971	23,386	22,974	.....
China.....	13,779	21,547	24,921	32,725	26,750	27,050	.....
Japan and Taiwan.....	21,838	30,571	35,052	38,667	40,896	40,868	.....
Australia.....	12,617	13,452	13,435	12,618	13,320	14,637	15,582
Russia in Asia.....	2,162	2,386	4,033	28,867	36,242	42,045	43,200
U. of S. Africa.....	7,984	11,798	12,700	12,195	13,574	14,842	15,491

CRUDE PETROLEUM: Production (Thousands of Barrels of 42 U. S. Gallons)

Table 40	1913	1921-25 average	1926-30 average	1934	1935	1936	1937	1938
World total.....	385,345	944,777	1,316,382	1,521,445	1,654,688	1,801,786	2,040,500	1,977,189
America:								
United States.....	248,446	647,961	895,762	908,065	996,596	1,099,687	1,277,653	1,112,837
Mexico.....	25,696	156,091	57,782	38,172	40,241	41,028	46,907	.....
Trinidad.....	504	3,259	7,234	10,894	11,671	13,237	15,503	.....
Venezuela.....		7,313	95,987	136,103	148,529	154,794	185,701	.....
Peru.....	2,071	6,465	11,753	16,314	17,067	17,593	17,467	.....
Argentina.....	131	3,855	8,789	14,025	14,297	15,458	16,236	.....
Colombia.....		453	16,417	17,341	17,595	18,752	20,293	.....
Europe:								
U. S. S. R. (Russia).....	62,834	40,322	93,459	174,986	182,386	197,418	199,475	.....
Rumania.....	13,555	11,819	31,594	62,011	61,310	63,655	52,176	.....
Poland.....	7,818	5,483	5,314	3,913	3,812	3,788	3,708	.....
Asia and Africa:								
Persia.....	1,857	26,312	41,394	57,851	57,304	62,699	78,741	.....
Netherland India.....	11,172	19,158	32,366	46,925	47,171	50,026	56,275	.....
India.....	7,930	8,472	8,484	9,201	9,219	9,566	9,852	.....
Sarawak.....	141	3,324	5,061	5,140	5,546	5,343	6,026	.....
Japan and Taiwan.....	1,940	1,964	1,918	1,821	2,250	2,445	2,487	.....
Egypt.....	98	1,169	1,632	1,546	1,295	1,277	1,149	.....

IRON ORE: Production (Thousands of Metric Tons of 2,204.6 Pounds)

Table 41	1913	1926-30 average	1937	1938		1913	1926-30 average	1937	1938
America:					Europe (Continued):				
United States.....	62,972	65,636	73,251	28,444	Sweden.....	7,476	9,100	.....	935
Cuba.....	1,608	456	496	.....	Yugoslavia.....	220	400	629	.....
Newfoundland.....	1,457	1,309	1,636	.....	Asia:				
Chile.....	14	1,603	1,490	.....	China.....	423	1,459	.....	.....
Europe:					Chosen.....	142	503	.....	.....
Austria.....	3,039	1,539	1,885	.....	British India.....	377	1,999	.....	.....
Czecho-Slovakia.....		1,650	1,772	.....	Unfederated Malay				
France.....	21,918	46,709	37,772	5,872	States.....	7,544	559	.....	.....
Germany.....	28,608	5,811	8,522	22,962	Philippine Islands.....			754	.....
United Kingdom.....	16,254	10,446	10,500	10,587	Africa:				
Hungary.....	2,059	187	290	.....	Algeria.....	1,349	2,009	2,326	.....
Italy.....	603	613	900	2,286	Morocco.....			1,487	.....
Luxemburg.....	7,333	7,254	7,750	1,422	Tunisia.....	598	842	947	.....
Norway.....	545	518	1,050	.....	U. of S. Africa.....			462	.....
Poland.....		547	780	1,463	Australia:				
U. S. S. R. (Russia).....	9,514	6,283	28,365	18,699	New South Wales.....	76	143	.....	.....
Spain.....	9,862	5,195	.....	239	Queensland.....	41	2	.....	.....
					South Australia.....	62	752	.....	.....

PIG IRON: Production (Thousands of Long Tons of 2,240 Pounds)

Table 42	1913	1920	1921-1925 average	1926-1930 average	1931-1935 average	1936	1937	1938
World total.....	77,714	61,846	60,481	85,064	56,047	90,238	101,378	79,345
North America:								
United States.....	30,653	36,401	30,166	37,387	15,655	31,073	37,146	19,341
Percent of world total.....	39.4	58.9	49.9	44.0	27.9	34.4	36.6	24.4
Canada.....	1,015	999	628	922	396	753	975	748
Europe:								
Germany.....	19,000	6,931	7,905	11,345	7,267	15,062	15,705	18,200
France.....	5,126	3,380	5,946	9,600	6,327	6,139	7,701	5,650
United Kingdom.....	10,260	8,035	5,705	6,029	4,787	7,685	8,352	6,700
Belgium.....	2,445	1,099	1,972	3,644	2,904	3,157	3,780	2,330
U. S. S. R. (Russia).....	4,563	113	588	3,636	8,165	14,317	14,370	14,845
Luxemburg.....	.....	682	1,688	2,636	1,929	1,955	2,473	1,415
Czecho-Slovakia.....	.....	725	763	1,378	696	1,090	1,624	1,200
Poland.....	.....	42	412	553	321	578	713	930
Spain.....	418	247	390	596	366	247	295	206
Italy.....	420	87	244	565	569	787	850	850
Austria.....	2,344	98	302	389	129	244	383	.....
Sweden.....	730	477	373	475	438	575	640	650
Hungary.....	.....	.....	99	275	128	301	352	.....
Asia:								
Japan.....	236	718	774	1,414	1,703	2,184	1,969	3,100
India, British.....	204	312	618	1,126	1,172	1,560	1,575	.....
China.....	239	125	212	168	434	640	640	.....
Oceania:								
Australia.....	47	344	324	426	395	679	680	.....
All other.....	100	1,031	1,381	2,608	2,256	1,212	1,067	.....

COPPER: Mine Production (Metric Tons of 2,204.6 Pounds)

Table 43	1921-25 average	1926-30 average	1935	1936	1937	1938
World total.....	1,111,611	1,659,200	1,496,000	1,723,000	2,200,000	.....
United States.....	562,765	779,294	345,174	557,566	760,008	508,936
Canada.....	35,465	93,216	190,053	190,974	240,875	265,626
Cuba.....	10,927	9,059	6,960	11,163	13,191	15,241
Mexico.....	39,465	68,763	39,373	29,713	46,077	44,000
Bolivia.....	8,987	7,304	1,913	3,249	3,699	3,460
Chile.....	173,622	262,612	267,083	256,209	413,186	.....
Peru.....	36,928	51,745	29,653	33,352	36,649	34,669
Austria.....	2,167	2,380	55	12	.....	.....
Finland.....	.....	.....	11,987	11,391	12,032	.....
Germany.....	20,518	27,031	27,420	26,906	32,000	.....
U. S. S. R. (Russia).....	2,744	21,820	63,247	82,999	93,000	.....
Spain.....	27,165	55,200	30,000	30,000	31,300	.....
Yugoslavia.....	6,884	15,600	41,700	39,600	42,300	42,184
Japan (proper).....	59,594	71,480	70,914	77,973	87,600	.....
Australia.....	14,379	10,966	17,263	18,859	20,000	18,144
Belgian Congo.....	69,231	111,638	107,682	95,667	150,500	.....
Northern Rhodesia.....	.....	4,800	171,366	173,468	212,700	.....

LEAD: Smelter Production (Metric Tons of 2,204.6 Pounds)

Table 44	1913	1921-25 average	1926-30 average	1935	1936	1937
World total.....	1,151,000	1,233,400	1,699,000	1,381,000	1,478,000	1,702,000
United States.....	385,643	502,732	615,544	294,075	362,055	423,232
Canada.....	17,202	59,014	134,112	148,558	164,857	181,162
Mexico.....	57,488	123,906	218,810	177,630	214,376	223,678
Argentina.....	.....	5,284	8,439	4,103	10,700	.....
Peru.....	.....	132	9,837	6,452	8,899	19,054
Great Britain.....	18,420	4,905	8,065	22,350	13,800	10,172
Belgium.....	53,590	60,887	86,813	68,890	67,000	93,804
France.....	28,817	17,251	22,797	14,575	14,500	38,860
Austria.....	22,312	4,271	7,241	8,048	8,732	10,246
Germany.....	188,000	54,591	91,260	122,300	139,100	166,100
Poland.....	.....	15,296	34,253	18,819	15,021	17,587
Italy.....	21,674	17,374	23,115	35,803	36,307	39,088
Spain.....	198,829	135,640	138,101	62,742	46,600	30,000
Yugoslavia.....	.....	9,006	10,775	7,554	5,804	4,039
India (Burma).....	5,951	44,305	72,880	73,217	74,329	77,728
Tunisia.....	.....	14,234	18,525	25,390	21,497	27,150
Australia.....	110,444	114,101	166,437	221,431	196,051	238,833
U. S. S. R. (Russia).....	.....	.....	.....	44,853	50,800	55,000

Table 45 ZINC: Smelter Production (Metric Tons of 2,204.6 Pounds)

	1913	1921-25 average	1926-1930 average	1934	1935	1936	1937
World total.....	839,000	823,000	1,355,000	1,168,000	1,332,000	1,461,000	1,621,000
United States.....	314,408	391,085	532,879	329,842	381,591	446,452	505,212
Canada.....	27,319	27,319	76,973	122,394	135,645	137,211	133,964
Norway.....	9,287	3,893	12,743	45,027	45,019	45,028	41,270
Great Britain.....	66,243	26,835	45,153	52,022	61,433	61,768	63,138
Belgium.....	204,220	131,608	193,657	174,900	181,740	195,320	225,579
France.....	67,890	47,037	82,853	47,248	47,443	54,009	60,427
Netherlands.....	24,323	15,030	25,378	19,911	13,747	15,428	24,645
Germany.....	109,361	38,832	89,980	71,196	123,198	133,760	163,200
Poland.....	.....	72,046	155,849	92,921	84,606	92,580	107,174
Italy.....	.....	3,945	12,145	24,864	27,579	26,575	37,767
Spain.....	6,003	10,366	13,733	8,184	8,916	7,800	5,300
Japan.....	900	13,540	20,071	32,145	34,191	39,066	45,500
Australia.....	4,187	32,078	51,515	55,506	68,752	71,641	70,869
Mexico.....	.....	139	13,600	29,148	32,327	31,913	31,412
Northern Rhodesia.....	.....	.....	10,100	19,854	21,012	21,083	14,256
U. S. S. R. (Russia).....	.....	732	3,000	27,084	47,910	66,000	65,000

Table 46 LUMBER: Foreign Trade of Specified Countries (Millions of Board Feet)

	United States		Canada Exports	Sweden Exports	Finland Exports	Norway Exports	U. S. S. R. Exports
	Exports	Imports					
1921-1925 average.....	2,145	1,593	2,019	1,690	1,718	190	.....
1926-30 average.....	2,819	1,572	1,988	1,927	2,188	183	1,275
1931-35 average.....	1,334	424	1,195	1,481	1,646	75	1,824
1936.....	1,256	617	1,750	1,579	1,926	52	1,974
1937.....	1,393	617	1,855	.....	.....	.....	.....

Table 47 COTTON SPINDLES: Number in Principal Countries (in Thousands)

	1933	1934	1935	1936		1933	1934	1935	1936
Total.....	157,548	156,831	153,972	151,782	Czecho-Slovakia.....	3,627	3,627	3,618	3,582
United States.....	30,893	30,942	30,093	28,147	Spain.....	2,070	2,070	2,070	2,070
Percent of total.....	19.6	19.7	19.5	18.5	Belgium.....	2,087	2,106	2,090	2,009
Canada.....	1,240	1,187	1,155	1,110	Switzerland.....	1,176	1,295	1,265	1,241
Mexico.....	832	862	862	862	Poland.....	1,818	1,696	1,688	1,707
Brazil.....	2,620	2,702	2,709	2,712	Netherlands.....	1,224	1,236	1,219	1,220
United Kingdom.....	49,001	45,893	42,688	41,391	Austria.....	758	774	760	773
Percent of total.....	31.1	29.3	27.7	27.3	Other Europe.....	2,774	2,883	2,741	2,822
France.....	10,144	10,170	10,157	9,932	India.....	9,506	9,572	9,613	9,705
Germany.....	9,850	10,109	10,109	10,109	Japan.....	8,209	9,115	9,944	10,867
U. S. S. R. (Russia).....	9,200	9,800	9,800	9,800	China.....	4,585	4,680	4,810	5,010
Italy.....	5,334	5,487	5,481	5,483	All other.....	600	625	1,000	1,250

Table 48 ELECTRIC POWER: Output in Principal Countries

	Output of electric current				Output of electric current		
	Total, million kilowatt-hours				Total, million kilowatt-hours		
	1925	1936	1937		1925	1936	1937
World total, estimate.	160,000	.....	.....	Europe (continued):			
North America:				Germany.....	11,521	42,487	50,000
United States.....	73,791	113,602	120,997	Italy.....	7,600	13,563	14,361
Canada.....	10,480	25,402	27,584	Netherlands.....	896	2,336	2,576
Mexico.....	561	2,246	2,480	Norway.....	4,200	7,985	.....
South America:				Poland.....	1,300	2,863	3,356
Argentina.....	1,292	1,951	.....	Russia.....	.....	32,800	.....
Europe:				Sweden.....	3,500	7,425	8,000
Belgium.....	3,214	4,943	5,549	Switzerland.....	4,190	6,055	6,555
Czecho-Slovakia.....	.....	3,500	4,000	United Kingdom.....	8,320	25,925	28,760
Denmark.....	223	621	754	Yugoslavia.....	.....	796	913
France.....	9,700	16,300	17,600	Asia: Japan.....	6,400	24,112	26,714
				Oceania: Australia.....	.....	3,528	.....

WATER POWER: Developed and Estimated Potential, 1939

Table 49	Horsepower			Horsepower	
	Developed	Potential		Developed	Potential
World total.....	61,480,000	666,000,000	Asia total.....	6,300,000	148,000,000
North America total.....	26,000,000	77,000,000	Afghanistan.....	2,000	700,000
United States.....	17,284,400	33,500,000	Arabia.....	18,500	
Alaska.....	36,600	1,400,000	Chinese Republic.....	3,500	22,000,000
Canada.....	8,112,800	25,500,000	Chosen (Korea).....	225,000	700,000
Mexico.....	450,000	8,500,000	French Indo-China.....		6,000,000
Newfoundland.....	270,000	600,000	India.....	500,000	39,000,000
Central America.....	101,000	7,000,000	Iran (Persia).....		300,000
West Indies.....	40,000	200,000	Japan.....	5,200,000	7,200,000
South America total.....	1,100,000	74,000,000	Siam and Malay States.....	50,000	5,700,000
Argentina.....	67,000	5,400,000	Taiwan (Formosa).....	237,000	1,000,000
Bolivia.....	13,500	3,600,000	Russia in Asia.....	77,000	64,000,000
Brazil.....	719,000	36,000,000	Africa total.....	180,000	274,000,000
Chile.....	189,000	3,600,000	Algeria.....	400	300,000
Colombia.....	25,000	5,400,000	Angola.....	4,000	5,700,000
Ecuador.....	16,000	1,300,000	Belgian Congo and Mandate.....	70,000	130,000,000
Guiana, British.....		3,600,000	British Central Africa.....		1,700,000
Guiana, French.....		700,000	British East Africa.....	6,200	6,700,000
Surinam (Dutch Guiana).....		1,100,000	Egypt.....	1,000	850,000
Paraguay.....	500	2,800,000	French Congo.....		50,000,000
Peru.....	55,000	6,400,000	French Guinea.....		3,000,000
Uruguay.....		400,000	French Cameroon Mandate.....		18,500,000
Venezuela.....	15,000	4,300,000	French Sudan.....		1,400,000
Europe total.....	27,200,000	71,000,000	Gold Coast and (British) Togo.....		2,000,000
Albania.....	1,000	700,000	Ivory Coast, Dahomey and (French) Togo.....		4,000,000
Bulgaria.....	64,000	400,000	Liberia.....		5,700,000
Czecho-Slovakia.....	310,000	700,000	Madagascar.....	4,500	7,000,000
Estonia, Latvia, and Lithuania.....	24,000	235,000	Morocco.....	73,000	350,000
Finland.....	438,000	1,400,000	Nigeria and (British) Cameroon.....	6,000	13,000,000
France.....	5,250,000	6,000,000	Portuguese East Africa.....		5,000,000
Germany.....	3,550,000	3,550,000	Rhodesia.....	2,500	3,500,000
Greece.....	10,000	350,000	Sierra Leone.....		2,500,000
Hungary.....	5,000	160,000	Tanganyika.....	800	4,000,000
Italy.....	6,000,000	5,400,000	Union of South Africa.....	10,000	2,300,000
Norway.....	2,900,000	16,000,000	Oceania total.....	700,000	22,000,000
Poland.....	50,000	1,350,000	Australia and Tasmania.....	139,000	2,000,000
Portugal.....	72,000	450,000	Borneo including New Guinea and Papua.....	5,000	10,500,000
Rumania.....	127,000	3,000,000	Celebes.....	500	1,400,000
Spain.....	1,400,000	5,700,000	Hawaii.....	26,000	150,000
Sweden.....	1,874,000	4,000,000	Java.....	60,000	1,100,000
Switzerland.....	2,300,000	2,300,000	New Zealand.....	400,000	1,500,000
U. S. S. R. (Russia).....	1,463,000	14,000,000	Philippine Islands.....	21,500	2,000,000
United Kingdom.....	400,000	700,000	Sumatra.....	20,000	3,000,000
Yugoslavia.....	250,000	4,000,000			

RAILWAYS, HIGHWAYS, AND MOTOR VEHICLES OF THE WORLD

Table 50	R. R. Main- track mileage	High- way mileage	Number of motor vehicles		R. R. Main- track mileage	High- way mileage	Number of motor vehicles
North America:				South America:			
United States.....	238,539	3,200,000	29,400,000	Guiana, British.....	79	552	1,835
Alaska.....	800	1,978	3,732	Surinam (Dutch Guiana).....	83	230	365
Hawaii.....	847	3,085	57,911	Colombia.....	1,980	14,637	22,176
Canada.....	42,916	410,808	1,306,139	Venezuela.....	589	5,667	23,330
Newfoundland.....	974	3,662	4,665	Argentina.....	24,652	214,628	264,000
Mexico.....	14,157	56,923	100,156	Brazil.....	20,571	93,135	159,000
Central America:				Paraguay.....	752	3,728	1,945
British Honduras.....	25	150	246	Uruguay.....	1,700	22,487	60,992
Costa Rica.....	430	1,830	2,833	Bolivia.....	1,421	7,997	2,160
Guatemala.....	720	4,020	4,020	Chile.....	5,434	26,799	40,815
Honduras.....	950	511	1,225	Ecuador.....	773	1,938	3,622
Nicaragua.....	283	1,670	797	Peru.....	2,624	11,786	20,682
Panama.....	230	977	12,579	Europe:			
El Salvador.....	375	2,796	3,152	Sweden.....	10,273	89,617	191,947
West Indies:				Norway.....	2,688	25,289	79,759
Cuba.....	3,079	2,264	43,630	Denmark.....	3,201	32,211	144,901
Dominican Republic.....	145	930	2,595	Great Britain.....	20,121	178,103	2,418,728
Haiti.....	158	1,337	2,650	Eire.....	2,880	48,066	61,855
Puerto Rico.....	338	5,737	20,967	Belgium.....	5,098	20,246	223,770
West Indies, British.....	420	12,187	25,780	France.....	41,379	393,761	2,192,471

RAILWAYS, HIGHWAYS, AND MOTOR VEHICLES OF THE WORLD—Continued

Table 50	R. R. Main- track mileage	High- way mileage	Number of motor vehicles		R. R. Main- track mileage	High- way mileage	Number of motor vehicles
Europe (Continued):				Asia (Continued):			
Netherlands.....	2,348	16,031	147,905	Iraq.....	796	4,844	7,441
Czechoslovakia.....	8,368	43,564	105,527	Iran (Persia).....	613	12,278	12,735
Hungary.....	5,665	38,891	21,237	India, British.....	43,128	277,471	105,180
Germany.....	43,347	236,306	1,564,600	Ceylon.....	951	17,802	26,997
Switzerland.....	3,233	10,263	73,200	Netherlands India.....	4,561	42,587	69,196
Estonia.....	891	13,489	5,254	Indo-China, French.....	1,967	21,023	17,151
Finland.....	3,418	40,910	42,267	Philippine Islands.....	867	10,404	48,654
Latvia.....	2,033	21,185	5,534	Siam.....	1,925	2,445	10,000
Lithuania.....	1,419	19,632	2,679	China.....	9,497	62,100	38,316
Poland.....	12,817	208,579	34,324	Japan (proper).....	13,560	665,626	175,761
U. S. S. R. (Russia) (including Asiatic).....	86,299	1,682,109	514,440	Chosen.....	2,982	18,830	9,800
Italy.....	14,267	151,392	430,994	Taiwan.....	936	10,740	4,200
Portugal.....	2,159	19,407	46,705	Malaya, British.....	1,068	6,482	44,827
Spain.....	10,340	70,760	125,000	Oceania:			
Bulgaria.....	2,000	16,030	4,111	Australia.....	23,019	482,644	749,753
Greece.....	1,719	9,181	14,000	New Zealand.....	3,320	57,802	239,668
Rumania.....	6,348	84,951	25,070	Africa:			
Yugoslavia.....	6,339	26,197	14,784	Algeria.....	3,001	47,879	64,550
Asia:				Tunisia.....	1,306	7,492	18,004
Turkey.....	4,220	23,745	9,504	Morocco, French.....	1,148	5,134	58,437
Syria.....	890	6,362	10,439	Egypt.....	2,764	5,013	31,212
Palestine.....	329	1,895	7,715	Union of South Africa.....	14,753	83,616	324,084
				Madagascar.....	534	15,757	6,834

Table 51 MERCHANT MARINE OF PRINCIPAL COUNTRIES
(Number of Vessels)

	World total	United States	United King- dom	British Domin- ions	France	Ger- many	Italy	Nether- lands	Norway	Sweden	Japan	All other
1895....	30,288	3,220	9,227	2,309	1,164	1,730	1,239	458	3,041	1,432	339	6,129
1900....	27,840	3,135	8,914	1,924	1,214	1,710	1,176	406	2,380	1,433	484	5,064
1905....	29,750	3,457	9,348	2,017	1,497	1,996	1,209	505	2,210	1,548	691	5,272
1910....	30,053	3,469	9,417	2,078	1,465	2,178	1,080	628	2,065	1,472	846	5,355
1915....	30,720	3,249	9,285	2,068	1,539	2,166	1,177	809	2,174	1,462	1,155	5,636
1920....	31,595	5,457	8,561	2,270	1,758	1,138	1,115	987	1,777	1,297	1,940	5,295
1924....	32,916	4,882	8,559	2,430	1,828	2,028	1,353	1,099	1,805	1,389	2,087	5,456
1926....	32,615	4,627	8,369	2,477	1,769	1,986	1,401	1,109	1,844	1,380	2,087	5,566
1927....	32,175	4,503	8,216	2,439	1,752	1,090	1,429	1,156	1,805	1,371	2,035	5,479
1928....	32,408	4,435	8,204	2,479	1,682	2,080	1,429	1,290	1,787	1,383	2,048	5,591
1929....	32,482	4,383	8,172	2,507	1,662	2,127	1,380	1,339	1,807	1,385	2,059	5,661
1930....	32,713	4,223	8,238	2,516	1,651	2,157	1,380	1,401	1,916	1,417	2,060	5,754
1931....	32,344	4,007	8,157	2,529	1,653	2,171	1,347	1,429	1,990	1,428	1,969	5,664
1932....	32,247	3,946	7,971	2,567	1,644	2,151	1,323	1,445	2,008	1,433	1,964	5,795
1933....	31,700	3,845	7,705	2,528	1,627	2,084	1,278	1,413	1,970	1,395	2,019	5,836
1934....	30,997	3,739	7,469	2,498	1,567	2,043	1,242	1,426	1,908	1,339	1,949	5,817
1935....	30,979	3,692	7,349	2,483	1,479	2,080	1,231	1,414	1,862	1,294	2,146	5,949
1936....	30,923	3,376	7,246	2,458	1,420	2,094	1,246	1,420	1,858	1,259	2,367	5,978
1937....	31,183	3,485	7,264	2,447	1,366	2,191	1,270	1,416	1,901	1,249	2,564	6,030

MERCHANT MARINE OF MINOR COUNTRIES
(Thousands of Tons)

	1933	1934	1935	1936	1937		1933	1934	1935	1936	1937
Argentina.....	342	340	343	331	319	Latvia.....	198	193	190	170	185
Belgium.....	456	415	402	388	420	Mexico.....	....	....	....	36	41
Brazil.....	494	499	491	479	476	Panama.....	287	272	137	429	512
Chile.....	156	157	146	143	142	Peru.....	60	49	44	46	37
China.....	401	398	455	492	600	Poland.....	....	....	95	92	93
Cuba.....	39	40	35	33	34	Portugal.....	266	263	260	255	253
Danzig.....	256	264	266	....	....	Rumania.....	93	92	92	91	88
Denmark.....	1,168	1,104	1,101	1,136	1,118	U. S. S. R.....	843	942	1,114	1,218	1,258
Estonia.....	126	121	126	155	168	Spain.....	1,232	1,178	1,178	1,157	1,054
Finland.....	421	469	481	481	549	Turkey.....	188	193	199	196	195
Greece.....	1,417	1,507	1,711	1,801	1,855	Yugoslavia.....	374	357	347	373	379
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